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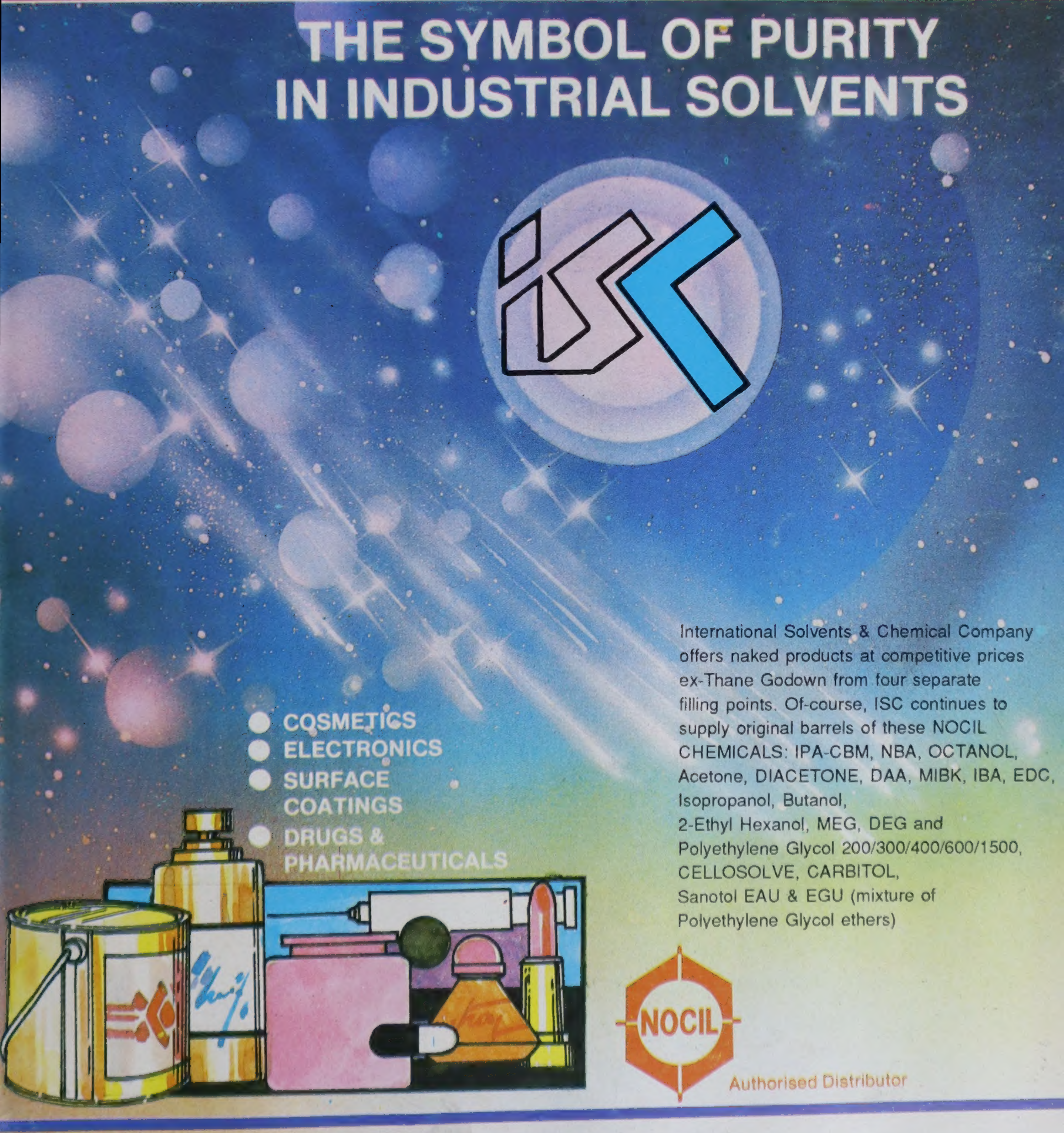

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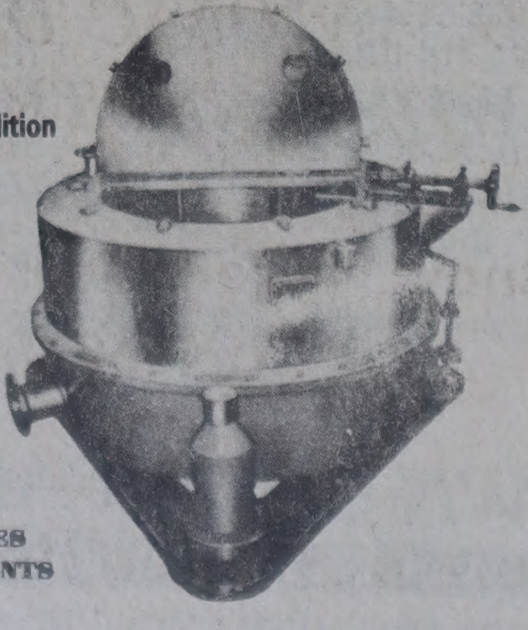

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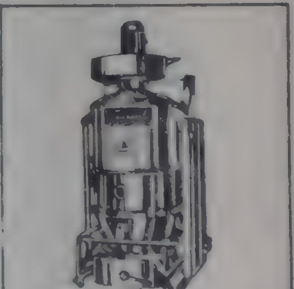

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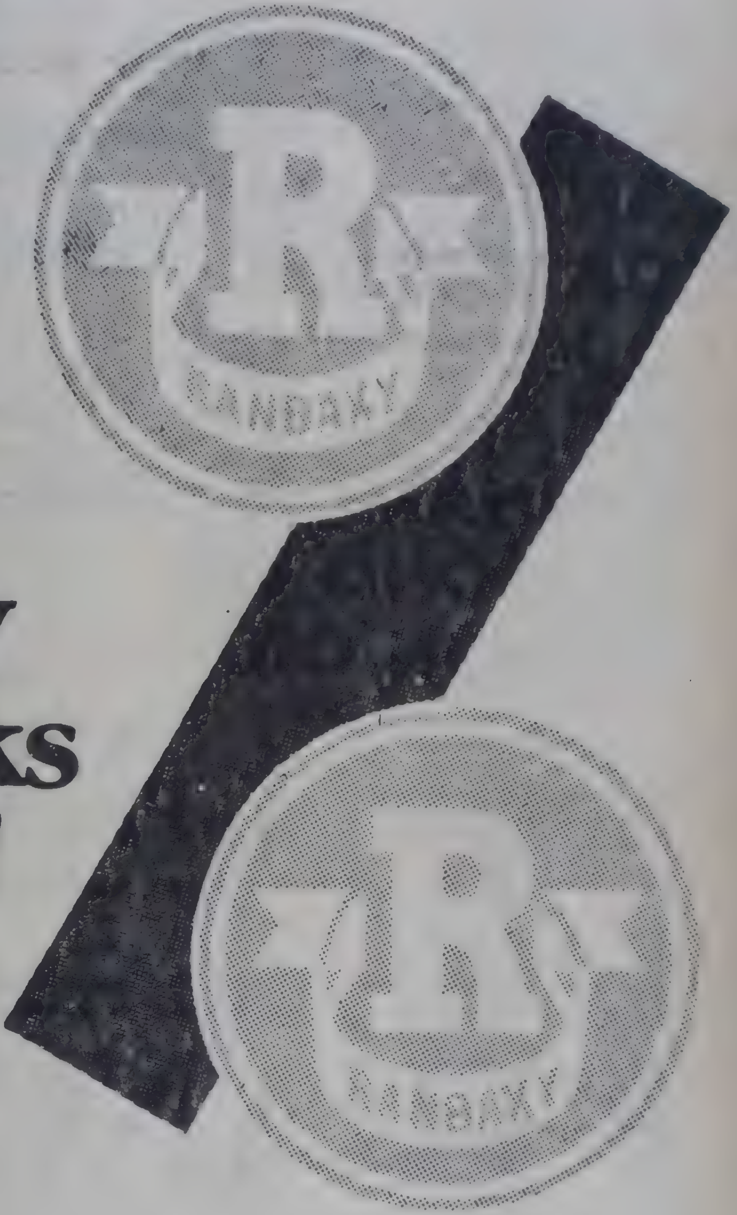

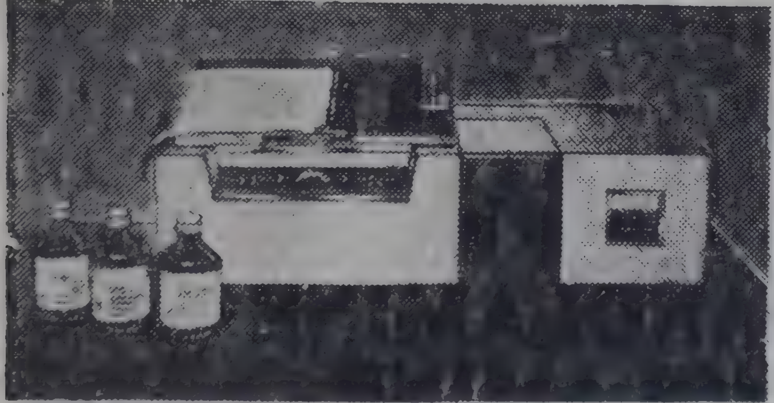

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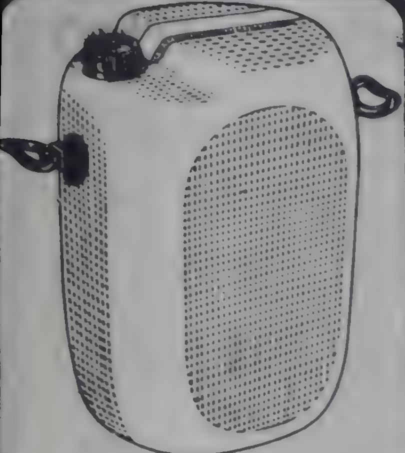

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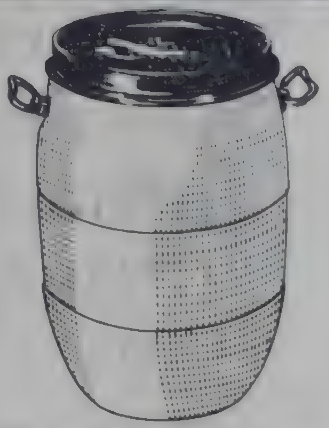

50 Kgs. Round Drum
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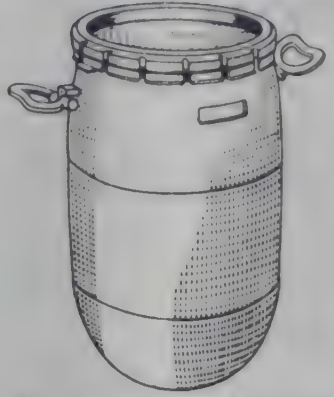

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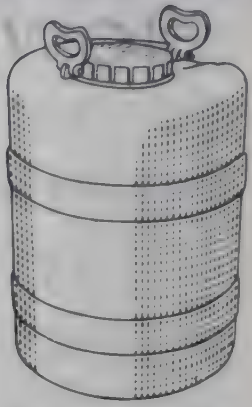

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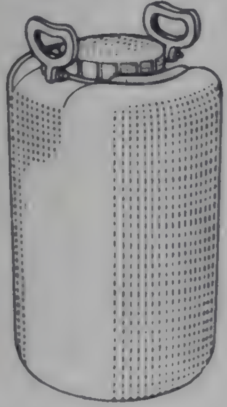

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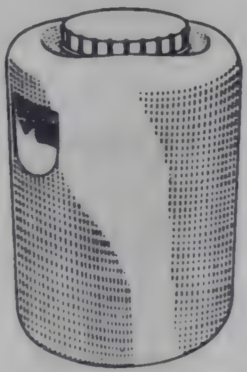

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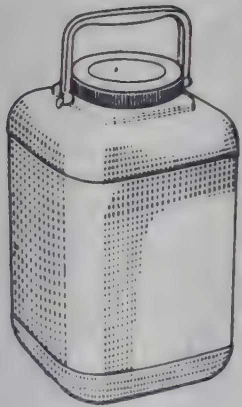
— 6″ Cap



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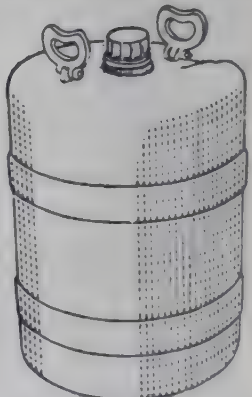

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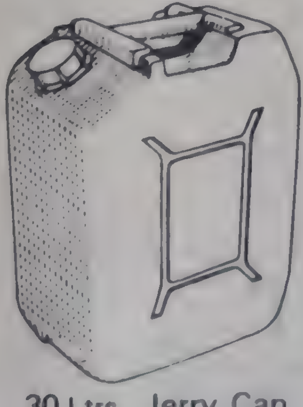

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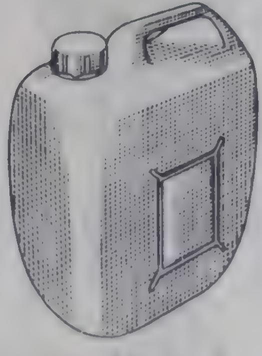

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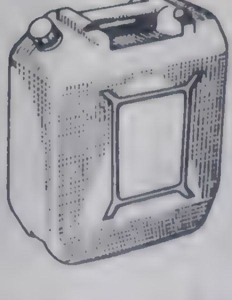

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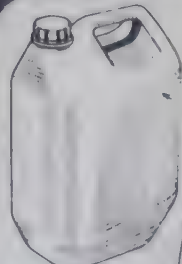

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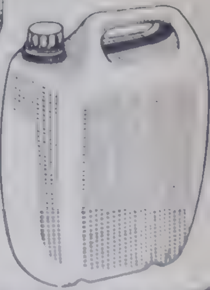

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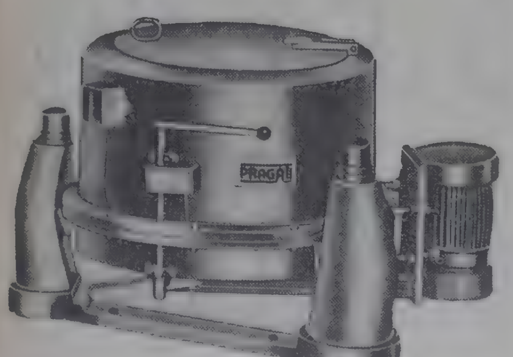

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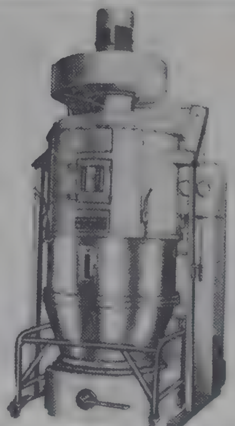

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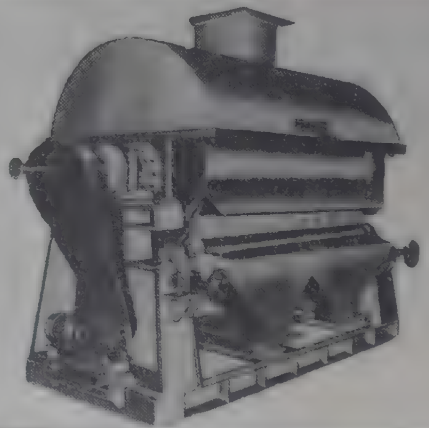

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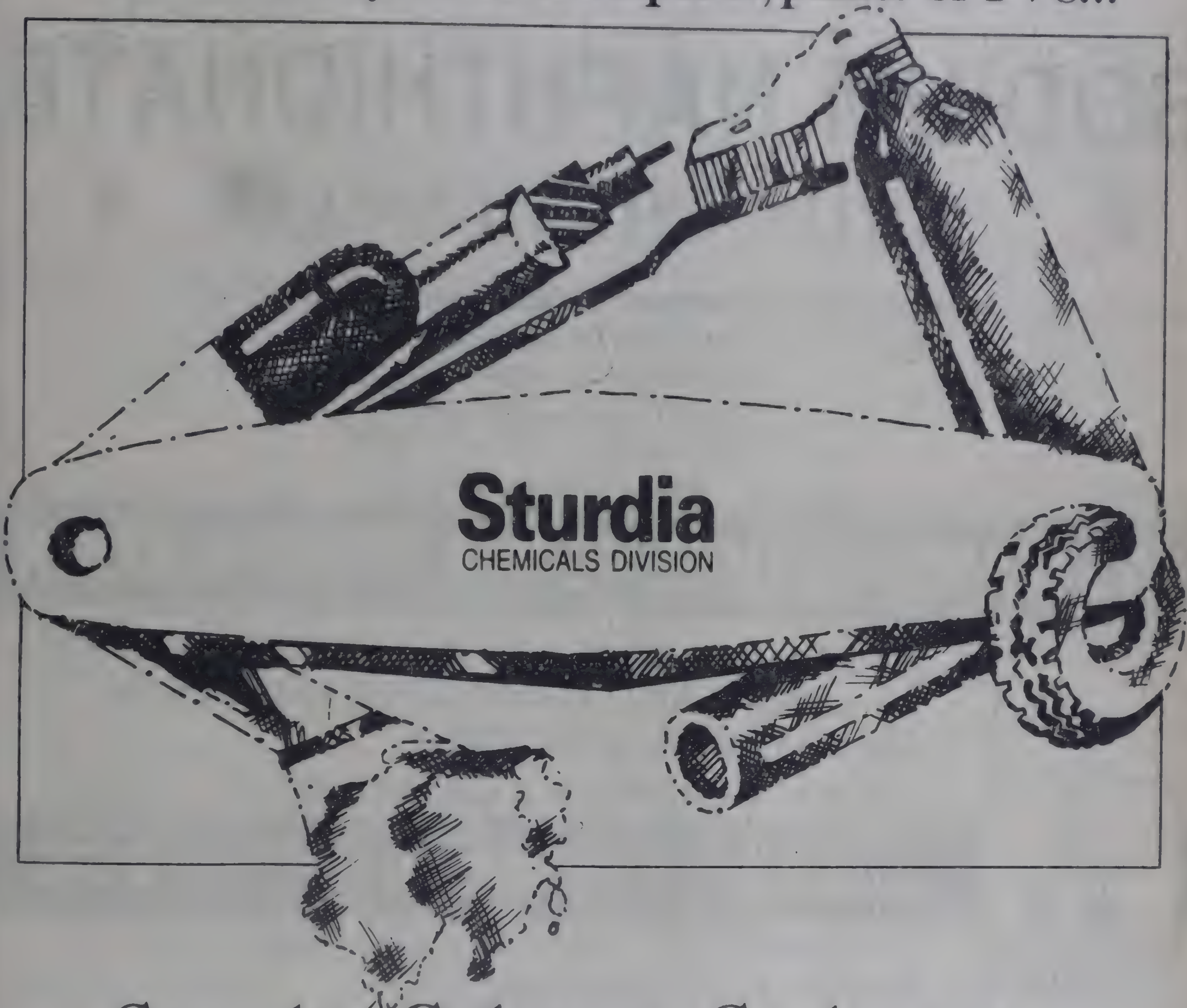

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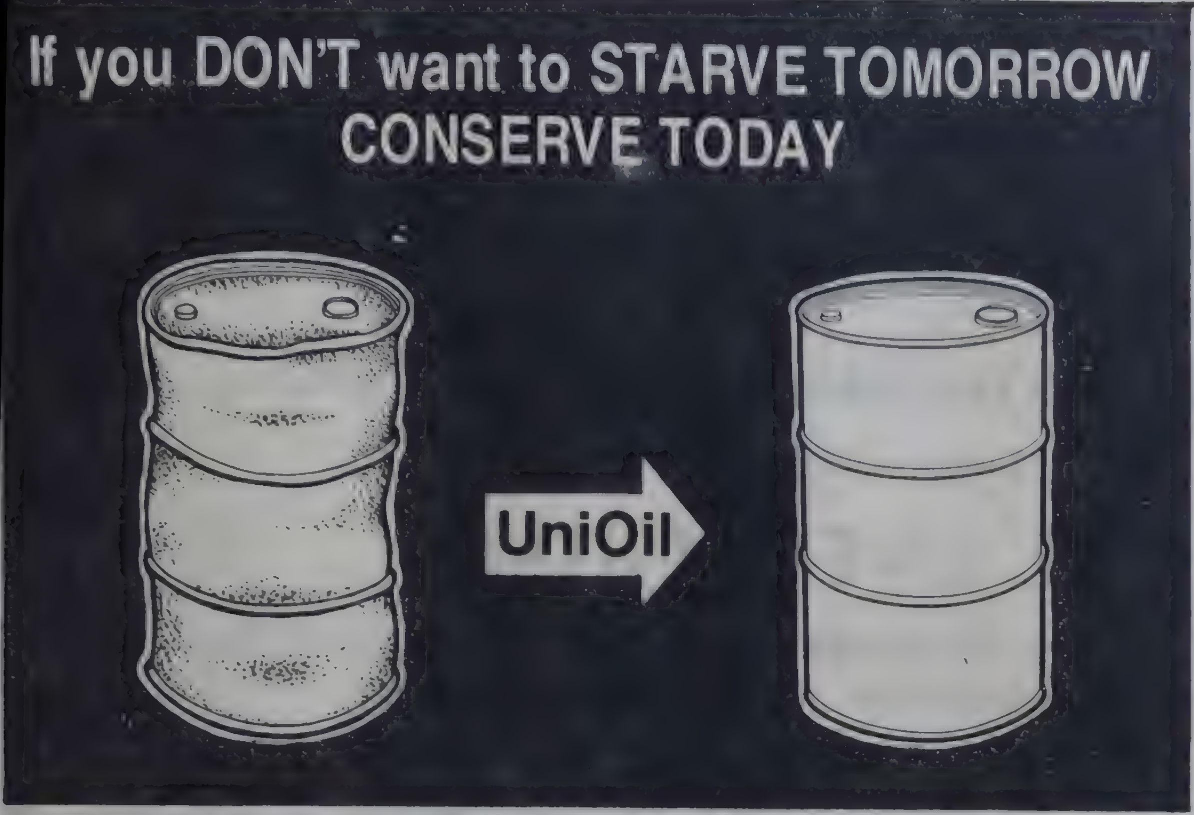
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Pipeline Transport of Minerals

Transportation of minerals and ores by pipelines in slurry form has been in use in the West for quite some time. he earliest application of this mode of transport dates back efore the turn of this century when a licence was issued in e UK in 1891 for a method of pumping coal and water. owever, a slurry pipeline has been considered as an attracve alternative to other modes of transportation for long disance haulage of material only since the late 1950s.

Today, there are more than a score of pipelines, carrying variety of minerals, including coal, limestone, rock phoshate and iron and copper concentrates, in various parts of e world.

The primary reason for the acceptance of long distance lurry transportation as a viable mode is its attractive ecoomics. Pipelines show tremendous economies of scale since perating costs are significantly reduced as the volume of ransportation and distance increase. Besides, a pipeline ystem has a high degree of efficiency and reliability. Furhermore, it assures continuous supply with reduced storage osts at the consumption points.

xisting Systems

A pipeline system broadens the economic reach of mineral deposits that may be utilised. The Savage River ion ore ipeline in Tasmania, Australia, is a case in point. The exisence of these ore deposits had been known for nearly a cenury and even though they are located only 50 miles from he coast they were considered uneconomic to exploit because f their inaccessibility due to an extremely rugged intervenng terrain. The 86 km-long pipeline was commissioned in 967. It was a pioneering effort in the transport of iron ore concentrate as the possibilities of using rail or truck transport were ruled out due to the hostile terrain.

The system is used to transport 2.25 million tons of iron re per year in a slurry of 60 per cent solids by weight. It has one pumping station at the concentrator site having four electric motor driven 450 kw. pumps. The pipeline is buried underground. It is reported that the system which is in its 13th year of operation is operating at 97% capacity.

The longest pipeline in the world is the Energy Transport System Inc coal pipeline in the USA carrying 25 million tonnes of coal per year from Wyoming to Louisiana -- a distance exceeding 1600 kms.

Brazil can claim the distinction of having installed the longest pipeline for the transport of iron ore concentrates at Samarco in 1977. The 45 cm dia pipeline extending to over 397 km deals with 12 million tonnes of iron ore per year. Indonesia holds the record for a copper concentrate line -- dia 12 cm extending to 111 km to deal with one million tonnes per year, installed in 1977 at Irianca.

England has a 92 km long 2.7 cm dia pipeline for transporting limestone, installed in 1964.

Brazil transports phosphate from Velep through a 113 km long 24 cm dia pipe having a capacity of 1.8 million tonnes per year.

India has large reserves of high grade iron ore with proven deposits of approximately nine billion tonnes of haematite and 2.8 billion tonnes of magnetite. Considerable efforts are being made to increase the production of iron ore for indigenous steel plants as well as for exports. Iron ore, ground for pellet feed to steel plants is highly suitable for pipelining in slurry form. The 60 km pipeline at Kudremukh is based on the same principle. Besides this, a feasibility study has been made for transportation of iron ore from Bailadila to Vishakapatnam.

A survey reveals the potential for some of the mineral transport pipeline in India. (See Table 1 on p. 42)

Table - 1
POTENTIAL SLURRY PIPELINE SYSTEMS IN INDIA
(MTA: Million Tonnes per Annum)

User	Capacity	Distance	Location
Iron Concentrates:		275	Bailadila to Visakhapatnam
NMDC	5-10	140	Baba Budan to Mangalore
NMDC	7.5	73	Dhangarwadi Mines to Ratnagiri
Bauxite:			
BALCO	0.3-0.6	40	Damodar river to Jharia coalfields
Sand (for stowing):			
BCCL	1-3	40	Durmala to Harrawala
Rock Phosphate:		12	Jhamarkota mines to Umra railway station
PPCL	0.3-0.6		
RSMML	0.6	10	Maton Mines to Debari Zinc Smelter
HCL	0.1		

Bauxite

A feasibility study has been carried out by IIT Delhi for the hydraulic transportation of bauxite ore from the Dhangarwadi Mines to Ratnagiri. Results of this study have indicated that it is both technically and economically feasible to transport bauxite ore by pipelines. The huge reserves of bauxite on the east coast of India can also be exploited by pipelines.

Comparative economics of various modes of transportation is generally dependent on various factors such as the distances involved, throughputs of solids to be transported, pre-existence of rail or road facilities, acceptability of solids in the ground form by the user industry, acceptable limits of moisture contents etc. For short distance hauling, where solids are readily available in slurry form such as in mineral processing industry, pipelining is a natural choice. In situations where the solids have to be specifically ground for the purpose of transportation, the resulting additional costs are likely to be prohibitive unless the distance and the quantity involved are large (greater than 500 km. and five million tons per annum respectively).

For haulage distance greater than 100 km. where rail links are in existence, pipeline transportation is found to be competitive if the throughput is higher than one million tonnes per year. According to a study conducted by Prof R.C. Malhotra and Dr. V. Seshadri of IIT, Delhi, for the Bharat Aluminium Company on the viability of pipelining bauxite ore over a distance of 73 km. in west coast of Maharashtra the operational cost per ton works out to be about half that of transporting it by company owned trucks (See table-2 alongside).

Table - 2
COMPARATIVE COSTS OF SLURRY PIPELINE AND TRUCK TRANSPORT FOR BAUXITE ORE DISTANCE 73 KM.

Mode	Capital investment (in Rs. lakhs)	Operational cost (Rs. per ton)
Slurry pipeline	1381	41.21
Company owned trucks	1666	81.89
Contract trucks	37	55.67

Research

Basic research studies on transportation in slurry form have the Central Mining Research Station, Dhanbad. Design and engineering expertise has been developed by the Engineers India Limited which is actively collaborating with IIT, Delhi. Several techno-economic feasiblity studies have been completed by these organisations for the transportation of various materials such as copper and zinc tailings, bauxite, rock phosphate and sand for stowing in mines. Based on these, pipelines for disposal of zinc and copper tailings have been installed in India.

But still, the Government has shown lack of initiative to adapting this new technology. Prof. R.C. Malhotra of IIT Delhi says "public sector planners rush to foreign cmpanies for technical know-how whereas it is locally available thus wasting foreign exchange".

In this context it is appropriate to recall that in the early sixties, the late Dr. A. Laheri of the CFRI had advocated the installation of slurry pipelines to supply all the essential raw materials for the Durgapur, Rourkela and Bhilai Steel Complexes to relieve the strain on the railway network.

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.L. VENKITESWARAN

Priestley Medal for Roald Hoffman

The prestigious Priestley Medal of American Chemical ociety for 1989-90 goes to Dr. Roald Hoffman, who is lready a Nobel Prize winner in 1981 -- jointly with Prof. Voodward for the Woodward-Hoffman rules which use conervation of orbital symmetry to determine whether and how oncerted thermal and photochemical reactions occur. (*CE ews* of 23rd April). The Priestley Medal is in recognition or Hoffman's wide ranging chemical accomplishments. ome of Professor Hoffman's remarks in his Priestley Medal ddress relate to the basic problems of chemistry, democacy and response to the environment and the present day oncerns on this subject.

Chemistry is the study of substances and their transformon which cover diverse disciplines such as metallurgy, cosnetics, fermentation, dyeing, medicals, food processing, hotochemistry, after an initial phase of alchemy. The science f chemistry is only about 200 years old although the natral products for colouring such as Tyrian Purple were disovered and used for centuries earlier. The real progress came vith coal tar and dyestuffs from it and then through calcium arbide, acetylene, ethanol on to the present era of petrochemcals. The dyestuffs led to chemotherapeutics, explosives, ferilisers and so on.

Prof. Hoffman devotes his address to the changes in social volution set into force by the Frech Revolution and the rowth of democracy, Rights of Man (and woman) and the itizen. To Priestley, the American and French Revolutions epresented a liberation of the powers of man from the feters imposed by nature. Democracy has been a social transormation as irreversible as chemistry. But chemists and hemistry have earned dubious repute in recent years -- a type f chemophobia and unreasonable irrational fear of the fallut from chemicals. Prof. Hoffman refers to the recent scare gainst Alar or Daminozide, a growth regulator used on pples. He feels that the effects of its use are too insignifcant to justify the ban for alleged carcinogenicity of UDMH lerived from it. But today there are far too many chemicals f uncertain repute for mankind to take a liberal approach.

What is important today are the right to know along with the duty to know all the aspects of chemical usage. Chemists have to be responsive to environmental concerns and the need for proper risk assessment and risk perception. Democracy imposes unavoidable risks to persons and property even if the perceptions of risks may be exaggerated. There is much to ponder over what are the levels of acceptable risks and their perceptions.

Risk perception and assessments are indeed complicated matters and with an element of subjectivity and psychological factors. Well informed public is the best safeguard on the level of risks that could be tolerated and acceptable. Risk perception has several aspects as quoted by Prof. Hoffman from Peter Sandman of Environment Communication Research Programme -- voluntariness of risks, moral relevance of risks, diffusion in time space of risks. Knowledge empowers -- the question of every case is whether the words used are used in such instances, and such a nature as to create a clear and present danger that they will bring about the substantive evils that Congress has a right to prevent.

The environmentalist is the one who does not want our nest fouled -- It is not a question of us and them but a clear perception of the acceptable levels of risks and hazards. In spite of such perceptions disasters like Bhopal did take place. Prof. Hoffman's worry is how best to prevent chemical illiteracy, alienation due to lack of adequate knowledge. Ordinary people he argues should be informed and empowered to make decisions. He wants that the angry chemist must sublimate his anger at unreasonable environmental activity into an opportuity to teach chemistry.

It is an indication of our times that for the chemists at the highest levels there is no choice but education and democracy. Nobel Laureate, choose this subject of the environment for their acceptance address to Societies like the American Chemical Society. May be the 21st century may witness better perceptions and efforts to eliminate risks to society.

Acrylonitrile demands and growth in USA

Acrylontrile is probably the third or fourth user of proylene and a near mature market with comparative low rowth rates for the five year 1988/93 period. Propylene became the feedstock for acrylonitrile years ago through the SOHIO ammoxidation process (now BP Chemicals is the successor to SOHIO technology) and totally displaced the use of acetylene/hydrogen cyanide or ethylene oxide/cyanide processes. The shift also meant a steep fall in use of hydrogen cyanide. The fibres based on acrylonitrile continue to be a major outlet while the copolymers using acrylonitrile -- ABS, SAN, nitrile elastomers together account for the second large usage. The estimate of use of acrylonitrile for different products and the production of these during 1982, 1988 and 1993 in USA is given in Table 1. Overall growth for the years ending 1993 is likely to be 4.3% of which the "others" category is 7% and nitrile elastomers 5%.

In India the acrylic fibre industry seem to have had poor growth prospects. IPCL was the pioneer but operated mostly at about 50% capacity and has recently shifted to a new fibre plant of more desirable qualities. JK is a producer in the private sector but also with low levels of produce. Main use of fibres is as substitute for wools and production and use are said to be about 60% of installed capacity levels of 60,000 tpa. But projections are only 44,000 tpa of fibres in 1992-93 while capacity is expected to double. The import duty is there to help indigenous production -- Rs. 10 per kg plus 150% or more *ad valorem*. Polyester staple also competes for the acrylic fibre market. Imports are less than 20% of usage. There is excess capacity in the international market and protection levies are inevitable. But much more efforts on the use of acrylic fibres are called for.

The offtake of propylene for acrylonitrile is too small to upset propylene production and usage. The propylene production, availability and trade balance between the major areas as of 1989 and 2001 are given in Table 2. The projections show a large surplus in USA at present but this may shrink by AD 2000. There is comparative tightness in the market in some parts with a lot of supplies ex-refineries.

Propane to propylene is taking hold and with fall in use of naphtha for cracking, coproduct propylene may fall. India is launching on a propane dehydrogenation plant and some imports of propylene to tide-over until the Reliance Petrochemical Cracker and the Haldia Cracker get into production.

Table 1
U.S. ACRYLONITRILE AND DERIVATIVES

(million pounds)

Item	**1982**	**1988**	**1993**	**% Annual growth 93/88**
Acrylonitrile consumption	1,232	1,376	1,700	4.3
Acrylic & modacrylic fiber	570	540	630	3.1
ABS resins	210	320	360	2.4
SAN copolymers	55	80	100	4.6
Nitrile elastomers	50	80	110	6.6
Others	347	356	500	7.0
Acrylonitrile derivatives production				
ABS resins	820	1,270	1,400	2.0
Acrylic & modacrylic fiber	624	590	680	2.9
SAN copolymers	167	220	275	4.6
Nitrile elastomers	98	156	200	5.1

Table 2
PROPYLENE DERIVATIVE TRADING BALANCES

(Propylene equivalents, million metric tons per year)

	Internal Propylene demand	**Propylene Supply**	**Exportable**
Base year, 1989			
United States	7.7	14.1	6.4
Europe	8.4	9.8	1.4
Japan	6.1	5.3	-0.8
Other market economies	2.0	2.6	0.6
Total	24.2	31.8	7.6
Main Scenario, 2001			
United States	11.3	12.2	0.9
Europe	12.5	13.0	0.5
Japan	11.0	11.2	0.2
Other market economies	3.8	5.7	1.9
Total	38.6	42.1	

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Gandhar gas cracker to cost Rs. 425 cr. more

The cost of the Gandhar gas cracker complex has shot up by Rs. 425 crore even as Indian Petrochemicals Corporation Ltd. (IPCL) is seeking PIB approval and stage-II clearance.

The project cost, originally estimated at Rs. 2,240 crore has now gone up to Rs. 2,665 crore. The foreign exchange component has also gone up by Rs. 40 crore to Rs. 610 crore from the original Rs. 570 crore.

The cost escalation, apart from the time overrun, is also partly due to the revision in end-product capacities. Against the March, 1990, deadline for receiving PIB approval, IPCL has only got pre-PIB clearance from the joint secretary and the financial advisor in the petroleums ministry.

IPCL has not yet decided on the overseas technical collaborators. For the gas cracker, the choice has been narrowed down to Lummus Crest and Stone and Webster. While IPCL's Baroda naphtha cracker is based on Lummus technology, the Nagothane gas cracker is based on Stone and Webster knowhow.

IPCL has set a deadline of 48 months, but will attempt to complete the project before that as Gandhar is near the sea coast and transporting equipment to the site will be much easier than that for the Nagothane project. However, the zero-date has been postponed now from October.

Speedy clearance also depends on IPCL's plans to enter into two joint ventures for two downstream products. While it has decided to rope in a private sector partner for the 100,000 tonnes alpha olefins plant, it is yet to decide on the second downstream product. IPCL received the first stage clearance in October, 1989, and the letter of intent recently.

Having learnt a lesson from the problems faced by the Nagothane plant in obtaining the proper gas fractions from ONGC's Uran gas fractionation plant, IPCL has decided to install its own gas fractionation plant at Gandhar. This will help IPCL to isolate C2 and C3, fractions and lean gas from the eight million cubic metres per day of natural gas it will need from the Gandhar fields. While lean gas will be supplied to the fertiliser companies, the C2 and C3 fractions will be used for cracking.

The Gandhar complex will have an ethylene capacity of 300,000 tonnes, which can later be increased to 400,000 tonnes, based on a 450,000 tonnes C2 and C3 plant. Among the intermediate products, the alpha olefins plant will have a capacity of 100,000 tonnes for production of 100,000 tonnes of primary alcohol. Also, the ethylene oxide and ethylene glycol plant will give rise to 100,000 tonnes of MEG, 200,000 tonnes of ethylene oxide to finally yield 100,000 tonnes of alcohol ethoxylates.

The other downstream products are — 20,000 tonnes of propylene, 10,000 tonnes of butadiene, 2,40,000 tonnes of ethyl dichloride, 1,58,000 tonnes of vinyl chloride, 1,50,000 tones of PVC, 1,05,000 tonnes of chlorine and 1,20,000 tonnes of caustic soda.

Apart from the plant size and product capacities, IPCL's investment is also earmarked for a 75 mw captive gas-based power plant and an integrated off-sites utilities plant for steam, oxygen, nitrogen, instrument air and cooling air.

PSF UNITS ACCUSED OF FORMING CARTEL TO HIKE RATES

Polyester staple fibre manufacturers have been accused of forming a cartel to raise prices by nearly Rs. 12 per kg. (an increase of 24 per cent over the August rates). The manufacturers plan to push prices by an additional Rs. 5 b October, Indian Spinners' Associatic claims in a press release. An increas in the price of DMT/PTA does not ju tify the steep hike of nearly Rs. 12 pe kg, the association president, Mr. G.I Lath said.

The international price of PSF ha gone up by merely a rupee. Against th the increase sought by the domesti manufacturers is too high, Mr. La points out.

In case the government fails to inte vene immediately, the textile units wi be forced to pass on the burden of th price hike to the consumers, Mr. La warns.

He urged the government to brin back the price to the August '90 leve and maintain it till an acceptable solu tion was reached.

IMPORT SUBSTITUTION AWAR FOR HLL

The Government of India's Gol Shield for excellence in import subst tution has gone to Hindustan Lever. Th award was presented to the company Executive Director, Mr. P.M. Sinha, b the Secretary, Technical Developmen Mr. H.C. Gandhi, at a function held at Udyog Bhawan, New Delhi on Se tember 17.

The award is in recognition of Hi dustan Lever's success in developin technologies for upgrading a wide ran of non-conventional, inedible vegetab oils such as rice bran, linseed, cast sal, karanja and kusum for use in t manufacture of toilet soap. By com pletely substituting the traditional soa ery oils (tallow and palm oil) which a imported, the country stands to sa large sums of foreign exchange eve year. In 1989 alone, the company us a total of 110,000 tonnes of unconve tional, inedible oils in soap makin valued at over Rs. 50 crores in forei exchange, at current prices.

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GULF CRISIS HITS AGARBATHI INDUSTRY

Export earnings may fall by 40 pc.

The beleaguered agarbathi industry has become the latest victim of the current Gulf embranglement. The industry has been badly hit by the loss of a huge export market, and also by the escalating price of raw materials like DEP (diethyl pthylate), owing to the shortage of the two compounds that go into it, pthalic anhydride and ortho-xylene.

Mr. B.S. Kanthraj, of B.V. Aswathiah and Bros, who is also the president of the All India Agarbathi Manufacturers' Association, says that "export earnings this year will be down by 40 per cent" and his company expects to lose something like Rs. 1,50,000 a month. Big export houses, with substantial stakes in Gulf countries are likely to suffer heavier losses.

Exporters immediately affected according to Mr. Kanthraj, are "those who have made shipments on a deferred payment basis to Kuwait," approximately shipments worth Rs. one crore are stuck up. Moreover, the closure of the Saudi port for nearly a month and half resulted in the diversion of cargo to European ports. The port was reopened recently and re-shipment to the Gulf will require additional freight payments, for which the exporters will have to get RBI clearance all over again.

Another leading exporter, who did not want to be quoted, says that the freezing of Kuwaiti assets by the American banks, has meant that payments have not been made for consignments already delivered. According to him, agarbathi is normally sent to Iran and Iraq from Kuwait and the present crisis has cut off this route. Even if normalcy were to return to the region immediately, he does not expect status quo to be restored for another year. The biggest markets for Indian agarbathi are Saudi Arabia, Kuwait, Doha and UAE. The Indian population in West Asia constituted nearly 30 per cent of the Gulf market. If the people fleeing West Asia don't return, this market will be permanently lost for India. The length of the agarbathi exported to the Gulf is double that of the normal ones, being more than a foot long. Though the shipments meant to the Gulf can be diverted to the African countries, it will mean time consuming re-negotiations. These consignments, therefore, are as good worthless.

The shortages in the supply of raw materials like DEP, which is an important dilutent compound has pushed up its price in the local market by over 30 per cent in the past one month, which in turn will lead to higher prices for agarbathi in the local market. Mr. Lokesh N. Vemulkar, of Padmini Products, makers of premium agarbathis, says that the Gulf crisis "will have a major impact on the local markets, especially Kerala which is consumer of premium, high priced brands."

SYNTHETIC RUTILE PLANT COMING UP AT MADRAS EPZ

A Rs. four-crore plant to make synthetic rutile, which is a raw material for making titanium dioxide used as a pigment in the paints, plastics, ceramic and paper industries, is being set up in the Madras Export Processing Zone (MEPZ). The project, promoted by Bene-Chlor Chemicals Private Limited, a new company set up by two technocrats, will use ilmenite sands found in plenty along the south-eastern coast of the company to make 15,000 of the chemical per year. The project is coming up in technical and financial collaboration with Dr. Wendell E. Dunn, Jr. a well-known high temperature chlorination expert who has patented the chlorine beneficiation process of ilmenite which contains about 60 per cent rutile. The end product will have a high rutile content of about 96 to 98 per cent. Dr. Dunn, who is the chairman of the company, also holds 40 per cent of the company's equity.

The plant and machinery are being fabricated in the U.S. and will be shipped shortly, said Mr. M.N. Venkatasubramanian, the managing director of the company, and the plant is expected to be commissined by the end of the year. The product will be exported mainly to the U.S., Japan and European countries where the demand for it is good, he said, adding that, following the environmental problems caused by the manufacture of sulphate pigments, major manufacturers are now going in for titanium based pigments. Bene-Chlor's equity capital is Rs. 1.32 crores, of which Dr. Dunn holds 40 per cent. The balance is funded by the Industrial Finance Corporation of India (IFCI) and the Indian Bank in the ratio 3:1. IFCI has also subscribed to the equity to the extent of Rs. 11 lakhs and Indian Bank Rs. 20 lakh, both on a buy-back basis.

RISE IN POLYMER PRICES LIKELY

A fall in global polymer productio following the Gulf crisis will lead to further rise in prices, it is feared. Thi will adversely affect the plastic proces-sing industry which is dependent o imports for almost half its requirements Ethylene spot prices have touche $1000 a tonne. Polymer production i Eastern Europe has been disrupted following discontinuance of feedstoc supplies from the Soviet Union.

A similar under-utilisation of capa city due to scarcity of feedstock ha been reported in the Far-East includin Japan and Korea. Indian polymer pro ducers will be forced to raise prices the government raises feedstock price as a conservation measure. Accordin to market reports, Oswal Petrochem cals, which increased LDPE price fro Rs. 31 to Rs. 34.50 recently, is plannin another increase to Rs. 36-37 a kg.

BASF plans new polystyrene plant

SF India Ltd. is planning to set up ,000 tonnes per year new polysty- plant at an approximate cost of 100 crore. The company has already ived a letter of intent for the project.

peaking to newsmen at Bombay Mr. . Thampi, chairman and managing ctor of BASF India Ltd., said that plant would have a 25% export obli- on. The company has already init- d steps to acquire land in Mangalore, nataka.

According to Mr. Thampi, since the ject had an export obligation, obtain- imported raw materials would not a problem.

However, the company would import materials only after it exhausted all ions of obtaining supplies from local rene manufacturers.

BASF has not yet finalised the ancing pattern of the Rs. 100 crore ject cost. The project will be imple- nted in technical collaboration with ASF AG of West Germany, the com- ny's overseas principal and one of the rld's largest styrene and polystyrene ducers.

BASF India Ltd. has also received vernment approval for raising the ensed capacity of expandable poly- rene from the present 2,400 tonnes r annum to 3,576 tonnes and of ather auxiliaries (organic chemicals) m 4,200 tonnes per annum now to 258 tonnes.

BASF has also declared a bonus issue equity shares in the ratio of 1:2. The mpany has also declared a 20% div- end. The bonus issue is being made capitalising a sum of Rs. 2.13 crore m the share premium account.

The government's lenient stand on pandable polystyrene imports resulted BASF's expandable polystyrene cing stiff competition from dumped goods from the East Asian manufacturers.

BASF India Ltd., reported a total income of Rs. 87.34 crore for the year ended March 31, 1990, against Rs. 89.88 crore in the previous 15 month period ending March 31, 1989. Profit before tax amounted to Rs. 8.03 crore (Rs. 7.56 crore).

1ST INTERNATIONAL CONFERENCE ON FRONTIERS OF POLYMER RESEARCH

The conference to be held in New Delhi, between January 20-25, 1991 will bring together leading international scientists and top level industrial management for discussion on the current status of EMERGING NEW TECHNOLOGIES IN POLYMER RESEARCH.

There will be a global participation of more than 200 scientists from more than twenty countries. The conference organised by Shriram Institute for Industrial Research, Delhi, is being co-sponsored by Department of Electronics, Govt. India.

Areas of polymer research to be discussed during the conference are:

- polymers for photonics
- polymers for Electronics
- High Performance Polymers.

EXHIBITION "ENT"

To complement the conference an industrial exhibition on "Emerging New Technologies" is being organized which will present selective displays of new technologies for this and the coming decades. The exhibition will have a worldwide participation from telecommunication, aerospace, chemical and electronic industries. For Further information write to: Dr.J.K. Nigam, Director, Shriram Institute for Industrial Research, 19, University Road, New Delhi - 110 007.

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PSF makers want PTA cut to be restored

Manufacturers of polyester staple fiber (PSF) have urged the government to prevail upon Reliance Industry to restore the supply of PTA to them. They have said that the cut in supplies will force the PSF units to close down.

According to the Association of Polyester Staple Fibre manufacturers, RIL has curtailed the supply of PTA by as much as 50 per cent. Further, there is no indication of the quantity that is likely to be made available for the rest of this month. The president of the association, Mr. S.N. Kuckreja, told newsmen that the PSF industry had been operating at around 40 per cent capacity till the budget this year. It was only after the budget that the demand started picking up. Most of the new units might even close down if PTA/DMT supplies were not made available to them. This development would, however, help RIL which is also the largest producer of PSF and PFY.

The association has already met the minister of petroleum and chemicals, Mr. M.S. Gurupadaswamy, along with senior officials of the ministries of commerce and petroleum. Mr. Kuckreja said that it was imperative for the government to resolve the problem arising out of RIL's stand, especially, as RIL is not expected to be hit much by the ten per cent cut in naphtha because of the recent government curbs. The association has said that if the past offtake is taken as the yard stick for allocation of PTA, as is being done onow, it would result in closure of those units which concentrated their efforts on exports during 1988-89 and 1989-90 (as their domestic offtake of raw materials was lower in this period).

The association has further told the government that the industry's exports would also suffer. This is because most of the PSF manufacturers bought PTA/DMT from the local market and subsequently replenished this by getting duty-free material under advance licens-ing procedure.

Yet another related problem is the government's failure to put PTA under OGL. The government should do this immediately besides reducing the import duties on the raw material. On its part, members of the PSF association would be willing to give an undertaking that the imports would be confined to the quantity required by them to carry the minimum level of production.

MAX INDIA TIE-UP WITH W. GERMAN FIRM

In a major diversification, Max India Ltd. has tied up with Schering A of West Germany for the manufacture of electroplating chemistry for printed circuit board (PCB) industry in the country. This 100 per cent export substitution project is expected to go on stream towards the end of this year.

According to a company source, the company is bent on bringing international cost efficiencies to the fast growing PCB industry in the country. The objective is to bring the PCB cost per square metre in line with the international norms and offer application support through a Delhi-based centre.

IMF MEET FOCUS ON OIL PRICE RISE

The 55th annual meeting of the boards of governors of the Industrial Monetary Fund and the World Bank group will be discussing the impact of oil rise on the world economies. The annual meet, from September 25 to 27, will be held under the chairmanship of Mr. George Saitoi, Kenya's Vice President and Minister of Finance.

The developing countries will also discuss the report of the South Commission, which tries to encourage self reliance among the developing countries, promote South-South co-operation and recommend adoption of more pragmatic approaches. Eastern Europe is another subject that is expected to command attention.

COMPANIES ACT LIBERALISED: TURNOVER CEILING FOR PVT. COS. RAISED

The Union government announced measures to liberalise various provisions under the Companies Act to ensure smooth operation of industrial and trading companies in the country, reports UNI.

Under this, the companies can now appoint persons within the age group of 25 to 70 years as managerial personnel subject to conditions laid down in the Companies Act without seeking the government's approval, says an official press releas. Hitherto, companies could appoint persons only within the age group of 30 to 65 years without the government's approval provided they satisfied prescribed conditions.

While this liberlisation measure will provide flexibility, it is clarified that the government would be averse to any proposal for appointment of persons of less than 25 years or more than 70 years to top positions in the companies.

Under the existing rules, a private company can increase its annual average turnover of Rs. 10 crore. This liberalisation measure will lead to economy on the part of the companies while preparing their annual reports.

Earlier a public limited company or a private company, which is a subsidiary of a public company, was required to appoint a managing director or full-time director or manager if its paid-up capital was Rs. one crore.

The limit has also been increased and only companies with paid-up capital of Rs. five crore and above will now be required to appoint such managerial personnel.

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KPCB to prosecute Harihar Polyfibres unit

In a significant move, the Karnataka Pollution Control Board (KPCB) has decided to prosecute Grasilene Industries, a division of Harihar Polyfibres Ltd. for polluting the Tungabhadra river.

The decision was taken at the board meeting at Bangalore on Sept. 10th. According to a board member and President of the Janavikas Andolan, Dr. S.R. Hiremath, the decision of the board was unanimous.

The "hesitation" of the pollution control board chairman on this issue had been "overruled", he told newsmen on September 10th. The board would file cases against Grasilene Industries for violating the board's norms and polluting the Tungabhadra river. Dr. Hiremath alleged that the Chief Minister, Mr. Veerendra Patil, had "interfered" in the affairs of the board earlier when a decision was taken on July 10 at its board meeting to prosecute Harihar Polyfibres and Grasilene Industries. The board had even resolved that "further proposals for approval in this behalf need not be brought before the board", he said. However, the decision was deffered following a letter from the Government requesting the board to reconsider its decision to prosecute the group, he said. According to Dr. Hiremath, the letter from the Chief Minister was the outcome of the meetings the representatives of the industrial group had with Mr. Patil immediately after the board took the decision to prosecute. The Grasilene division was releasing about 11 lakh litres of effluent into the Tungabhadra every day. This year it has increased its production.

On examination, it was found that the effluent released by the division did not fufil the norms of the pollution control board.

The management itself had admitted in a letter that there was no practical technolgy to remove the colour from the effluent, Dr. Hiremath pointed out. Meanwhile, the Janavikas Andolan, the Samaj Parivarthana Samudaya and the Save Western Ghats movement have demanded that environmentally conscious and concerned persons be appointed on the board. They have also demanded that the board's autonomy be fully restored. — **Financial Express.**

SAIL PLAN TO CHECK POLLUTION

The Steel Authority of India (SAIL) has embarked on a Rs. 318-crore plan to control pollution in its units.

Addressing the sixth national convention of environmental engineers at Ranchi, the SAIL Research and Development Centre General Manager, Mr. M.S. Chawla, said that 54 pollution control schemes involving Rs. 78 crores were underway. A joint venture has been commissioned to formulate and implement comprehensive environmental management plan for the SAIL plants. Assisted by the World Bank, the scheme encompasses state-of-the-art monitoring facilities for air, water and noise pollution establishment plants and training of personnel in monitoring and control of pollutants.

Mr. Chawala said, water and noise quality monitoring laboratories and a mobile laboratory for monitoring ambient air quality had been recently commissioned. Personal computer based data management system was also being developed. In order to facilitate special investigations, a highly sophisticated laboratory was also being set up at the corporate research centre. Under the modernisation scheme the Indian Iron and Steel Company and Durgapur steel plant are investing nearly eight per cent in pollution control measures. Under the scheme, thrust had been given to reduction of pollution and wastes. Indian steel plants were discharging higher contaminated water, solid waste and gases. Citing the example of Durgapur, he said the plant discharged 60 kg. of dust, 300 tonnes of contaminated waste, 1,500 kg. of solid waste and 20 tonnes of gases per tonne of steel.

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Good scope for drugs, dyestuff exports to EC

There is a significant potential for ort of bulk drugs and pharmaceut- ls and synthetic organic dyestuffs to C during 1990s, according to a recent dy on 'India's exports to EEC of emicals' by the PHD Chamber of mmerce and Industry (PHDCCI).

Releasing the study, the Chamber ce-president, Mr. Raghupati Sin- ania, said in the first six months of 89, India's chemical exports stood at CU 851 million as compared to ECU 2 million in 1988.

The major increases recorded were to eland, France, Spain and the UK hich increased by 106 per cent, 92 per ent, 81 per cent and 49 per cent respec- vely. Indian exports to Belgium and uxemburg increased by 40 per cent nd to Portugal by 39 per cent. How- ver. Denmark is the only country that has recorded a negative trend in export growth during this period. The major items of exports are rubber and articles thereof, bulk drugs and pharmaceuticals and organic chemicals. The study observed that over 45 per cent of the total export of bulk drugs to EEC reached West Germany.

Mr. Singhania giving details of the Indian chemical exports underlined the need for India to consolidate its base in FRG, France, Italy, Belgium, Luxemburg and the UK to be in a position to meet the possible growth in demand as result of expansion in the pharmaceutical sector in the EC. And as there is not much manufacturing activity for bulk drugs there, India has a vast scope.

It is observed that the dye intermediate industry has largely been discarded by most of the Europe-based companies on ecological grounds and this considerably explains the emergence of developing countries like India in the international trade of these product groups.

The study called upon exporters to continuously upgrade their competitive skills and also spend considerable amount on regular market research and survey for their line of products and adapt themselves to the changing circumstances on time. Mr. Singhania said that the Government should, on its part, formulate an exclusive strategy for EEC without delay.

Such a strategy should not in any way be affected by any dogma and should not be spread over a large number of products and exporters. It is necessary to select a limited number of items and competent manufacturers and exporters. Such items and such exporters should be freed from all policy and procedural hurdles and other irritants, he said.

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20% rise in prices of essential drugs

Prices of several essential bulk drugs have risen sharply by as much as 20 per cent over the last few months owing to a combination of factors ranging from escalation in input costs to suspension or slowdown in production.

Prices of rifampicin, an anti-TB drug, have risen sharply to Rs. 3,850 from Rs. 3,600 per kg just four months ago. Similarly, prices of the anti-typhoid drug, chloromphenicol powder, have also spurted to Rs. 1,700 a kg from Rs. 1,400 a few months ago.

Sources said the steep rise in prices of these items was mainly due to a fall in production triggered by the government's failure to clear the price revision applications.

In many other cases, the escalation in input costs is the main reason for price rise. Analgin, metronidazole, sulphamethaxole, trimethoprim and paracetamol, all vital bulk drugs, have shown an increase of about 20 percent in prices over the past few months.

Analgin, a pain reliever, is now selling at Rs. 280 a kg, up from Rs. 225 three months ago. Metronidazole, an anti-amoebic drug, has shot up to Rs. 480 from Rs. 400.

A couple of anti-bacteria drugs have also witnessed sharp increases. While sulphamethaxole has risen to Rs. 335 a kg from Rs. 290, trimethoprim has shot up to Rs. 1,175 from Rs. 1,050 three months ago.

In the case of paracetamol, an analgesic, prices have gone up from Rs. 135 a few months ago to Rs. 179. Industry sources aver that if the government does not allow a 'fair' hike in prices based on the actual rise in raw material costs, production of many of these items is bound to slow down further in the coming months, triggering a fresh bout of increase.

Though of late the government has begun clearing long-pending price revision applications, hikes have been allowed based on the outdated packaging norm. Thus, in effect, margin for drug firms continues to be under pressure in spite of the seemingly positive initiative taken by the ministry of petroleum and chemicals.

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GOVT. HAS NO PLANS TO BRING MORE BULK DRUGS UNDER PRICE CONTROLS

The petroleum and chemicals ministry has no immediate plans of bringing more bulk drugs under price controls.

According to ministry sources, the whole policy relating to drugs is now being looked into carefully. Many ideas on price approvals for drugs have been presented by different groups.

Before taking any decisions on modifications, the government will look into the necessity of maintaining adequate supplies of quality drugs at reasonable prices and the need for expansion and growth of the industry.

In addition, the drug industry has to be geared up for a greater export effort. Last year's exports at Rs. 843 crore represented a remarkable growth of about 80 per cent over the previous year.

A delegation of the industry met Mr. M.S. Gill, secretary of the department of chemicals, on September 13, and had a useful exchange of views with him.

Petroleum and chemicals minister Mr. Gurupadaswamy is visiting Bombay on September 26 to attend the annual meeting of the drug industry.

The government is looking forward to a further dialogue with the industry on that occasion as there is need for a deeper understanding on both sides.

Call to raise drugs output

Drug production in India can exceed . 16,000 crores by the turn of the cen-y, as against Rs. 3,400 crores at sent, provided the industry is given nurturing it requires, says the West ngal Small-scale Drug Manufactur- and Traders' Association.

In a recent communication to Gov-mment, the association called for set-g up of a national drug development thority, as recommended by the thli Commission, comprising mem-rs from the Government, large and all drug manufacturers and trade and edical bodies.

Due to the soaring inflation, the asso-ation also sought for revision of the iling of plant and machinery value for SI units from Rs. 35 lakhs at present Rs. 60 lakhs. Likewise, the turnover mit for a unit to qualify as a SSI unit ould be raised to Rs. 10 crores from e existing Rs. 5 crores.

It urged the Government to reserve anufacture of some commonly and equently used drug formulations, xclusively for the small scale drug ormulation units. This was essential ecause the organised sector had virtu-lly controlled 70% drug formulation nits.

The organised sector could still con-entrate of drug formulations requiring igh technology and undertake market-g of a few formulations manufactured y the small units.

The association also sought modifi-ations in the Government's policies egarding purchase of medicines under ne national health care programme. It aid that at present the Government pur-hased many non-essential medicines vhich should be stopped immediately.

Instead, a new list of 'essential drugs' hould be called region-wise so that rger quantities of essential drugs were urchased by the Government, and all the regions of the country got their due shares of the Government purchases.

The association criticised the recent move by the Drug Controller (India) to do away with larger packagings of drug formulations.

"We strongly oppose the move for reasons that this will enhance the cost of daily treatment of 70 per cent of our population who live in rural areas whose per capita income is around Rs. 40 per annum", the association's president, Dr. S.K. Sen, said in his communication the Government.

METHANOL PLANT: ONGC TO STUDY MARKET DEMAND

The Oil and Natural Gas Commission has offered to undertake a fresh study of market demands for the proposed 300 tonne per day gas-based methanol plant. Official sources said, that ONGC made the suggestion to the Tripura Industrial Development Corporation (TIDC) in view of recent market trends. Appropriate steps are being taken in this connection by the authorities.

Meanwhile, TIDC has requested ONGC to participate in equity share of the Rs. 120 crores project. While Rs. 40 crores is expected to be raised through equity participation, the rest will come from financial institutions.

The pace of work of the project slowed down recently because of delay in finalising the concessional rates for supply of natural gas. The State Government has been demanding the supply of natural gas at a rate of Rs. 500 per 1,000 cubic metre.

The public sector Rashtriya Chemicals and Fertilisers (RCF) had earlier taken a pioneering role in the project but dropped the idea later because of the Centre's indifferent attitude.

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Shrishma Fine up for sale

Shrishma Fine Chemicals and Pharmaceuticals Ltd., a Bangalore based company is up for sale.

The company is promoted by the Chaturvedis of ATV projects. It largely produces bulk aspirin drugs and chemicals such as paracetamol, salicylates, and salicyclic acid for pain killers.

The company has been importing technology from Poland for this purpose as it did not succeed in getting technology transferred from the United States. The technology imported has not only been inappropriate but also cost inefficient, according to Canara Bank sources. A high cost output ratio has compelled the unit to demand more assistance from Industrial Credit and Investment Corporation of India (ICICI). The working capital requirement of the company also increased subsequently. Both ICICI and Canara Bank — the only banker to the company are shy of extending any further assistance to the company. ICICI has lent to the tune of around Rs. 4 crores and Canara Bank has also lent significantly to meet the working capital requirements of the company.

The sources pointed out that the company has been running into losses due to cost inefficiency and price control. The Drug Price Control Order (DPCO) 1987 stipulates a price of Rs. 81 per kg. for aspirin, which is far below the cost price, it was pointed out.

The capacity utilisation of the company has also been far from satisfactory. Low capacity utilisation, faulty technology and administered prices of the drugs have all contributed to the sickness of the company. ICICI has worked out a rehabilitation package to tone up the operations of the company which is not very acceptable to the promoters, according to bank sources. It had been relying on exports which has, of late, been very insignificant because of its inability to compete in the international market. Yet another factor responsible for the illness is mismanagement, according to market sources. However, Canara Bank and ICICI deny this factor. It is reliably learnt that ICICI is now examining at length the technical and financial problems of the company, which are beyond the control of the promoters, and is likely to be ready with a clear report in the next few weeks. This, it is understood, is being done as a prelude to identifying takers for the company.

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ARBITRARY DRUG PRICING DEPLORED

Arbitrary decisions on pharmaceutical pricing by officials of the ministry of petroleum and chemicals has angered not only the industry, but even the Bureau of Industrial Costs & Prices. Dr. Vijay Kelkar, BICP chief, has written a "stinker" to Mr. M.S. Gill, secretary to the ministry, expressing displeasure over arbitrary pricing decisions by the ministry disregarding BICP recommendations, according to industry sources. All price revision applications from the industry have to be supported by documentary evidence like invoice copies of raw material inputs.

BICP decides the fair price on the basis of these documents and established packaging and conversion norms. Hitherto, the ministry used to approv BICP recommendations. Soon after hi assumption to office, Mr. M.S. Gurupadaswamy, petroleum and chemcials minister, ordered a "freeze" on price revision applications, pending what he called a review of the working of the 1987 Drug Prices Control Order. Following various representations from the industry, the ministry has now grudgingly begun releasing new prices —bu after arbitrary cuts, allowing only a fraction of the prices increases recommended by BICP. This is said to hav affected the

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PNFC sale plan raises eyebrows

The proposed sale of a rejuvenated Punjab National Fertilisers and Chemicals Ltd., to private sector promoters has raised eyebrows in financial circles.

The Punjab State Industrial Development Corporation (PSIDC) is reportedly considering disinvestment of its 46 per cent stake in PNFC in favour of a private sector promoter. What has, however, attracted flak is the manner in which the company is proposed to be given to the private sector after it had received extraordinary benefits from BIFR in course of its rehabilitation.

Reports in a section of the press have hinted at the possibility of Hindustan Levers taking up a controlling stake in PNFC. There have been other industrial houses which have been mentioned in the process, but HLL's bid for the company appears to be most serious.

PNFC was a sick company till only a year back and was gasping for financial relief. It was also characterised by 61 per cent holdings of public financial institutions in its stake. This comprised of 46 per cent equity held by PSIDC and 15 per cent equity with the Industrial Development Bank of India (IDBI). As a result, when the rehabilitation package for PNFC was taken up by the Board for Industrial and Financial Reconstruction (BIFR), the company was given a special treatment being generally in interest of public funds.

Besides the 'usual' benefits extended to sick companies, it is pointed out that PNFC got 'extraordinary reliefs amounting to nearly Rs. 3.5 crores because of its essential nature as that of a public sector company.

As a result of the package that was sanctioned in 1989, the company is now reported to be turning the corner. According to sources, the performance of PNFC has surpassed even the expectations of the institutions and it had started accruing additional cash profits.

The entry of private sector suitors at this stage is being seen as an attempt to take over the company after it has weathered the storm. Special objections are being raised to the 'extraordinary' benefits that would now accrue to the private company, if the sale were to come through.

Possibility is not being ruled out that BIFR may itself step in to put a check on the deal. As the company is still a BIFR case, the latter can exercise its discretion in such respects, it is pointed out. The board may also decide to veto the sale proposal or it may allow the sale after recovery of special concessions that were granted to the company. Or the other hand, PSIDC is of the view that it has only a developmental role i industrial development and therefore i should not hold controlling interest i its companies. Also the induction of private sector may help the company further, it is claimed. According to the scheme sanctioned by BIFR, PNFC was slated to make its net worth positive by 1997-98.

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The above seminar, scheduled to be held in March 1990, was postponed for various reasons. it is now re-scheduled as follows:

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Time: 9.00 a.m. to 5.00 p.m

Those who have already registered as delegates need not apply again. However those who would like to present a paper or would like to attend the seminar are requested to get in touch with: Convenor, Purvez Boywala, Consultant to Dupont FAR EAST INC., T5/5B, World Trade Centre, Cuffe Parade, Bombay-400 005. Phone: Off: 215673/214720, Resi: 231820/242169, Telex: 11-6846 WTC-BIN.

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Balmer Lawrie plan to make speciality chemicals

almer Lawrie and Company, the lic sector company having interests variety of fields, proposes to invest 25 crores in the next few years in high performance speciality lubri- ts — both synthetic and semi- thetic — performance chemicals ted to petroleum sector and energy servation.

Mr. A.A. Niazi, the new chairman of company, while talking to newsmen he end of the company's annual gen- l meeting at Calcutta on Sept. 14, pressed the hope that the turnover as equel to the investment was likely to e by about 30 per cent over the esent figure of over Rs. 222 crores.

Mr. S.K. Sinha, the managing direc- r, said the proposed diversification, to undertaken in the Eighth Plan period, ould be financed partly by way of ternal resources and partly by way of arket borrowing and loans from oil dustry development board fund. Ear- er, while addressing shareholders, Mr. iazi expressed the hope that the per- rmance in the current financial year 990-91) was likely to be much better an the previous year (1989-90) and ven better than 1988-89. This would be ossible because the factors which were sponsible for the drop in profits in 989-90 compared to 1988-89 would no nger be there.

In 1989-90, the company's profit fter interests, depreciation and tax, at s. 2.87 crores, was less than the pre- ious year's Rs. 5.82 crores. Mr. Niazi ttributed this decline mainly to the elivery of pending orders of about 700 arine freight containers to the public ector Shipping Corporation of India at nremunerative prices, even though the ost increased many times. The under- ecovery was to the tune of Rs. 1.5 rores. However, this would no longer e the case. Asked about the company's lan to enter the British tea market with its own brand of producers, Mr. Sinha said the details were being worked out. The brand, Indian Summer, was likely to hit the British market towards the end of the current year. The company, he pointed out, would concentrate in the value-added packet tea and tea bags.

Balmer Lawrie, its managing director said, also proposed to promote a new company, Indian Container Leasing Company, with 49 per cent equity participation, the balance 51 per cent going to the public. We will start with a small equity base of Rs. 475 lakhs, Mr. Sinha said and added that a cautious approach was being adopted to ensure the optimum infrastructure was available in the country to achieve operations well above the minimum viable level. At the meeting held on July 3, 1989, the members had accorded approval for bonus shares in the proportion of one for every two held. At board meetings, it was announced that April 1990 would be considered the effective month for the issue of the bonus shares.

The performance of the company's joint venture in Dubai was satisfactory in 1989-90. The authorised and equity capital of the joint venture company had been increased to Dhs seven million from Dhs five million by transferring an amount equivalent to the Dlrs two million, from general reserve. Balmer Lawrie's holding in the joint venture company at Dhs 3.43 million represents 49 per cent of the equity. In 1989-90, the company's turnover, at Rs. 222.74 crores represented an increase of about 12% over the previous year. The profit after tax was Rs. 2.87 crores (Rs. 5.82 crores). The directors dividend at 22 per cent on the enhanced capital base of 86,86,049 shares of shares of Rs. 10 each, inclusive of 46,63,799 shares which have been issued and subscribed as rights shares during the year.

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Asia Pacific regional conference on safety, health and environment

National Safety Council is organising the Asia Pacific Regional Conference on "Safety, Health & Environment —Prevention and Management of Hazards at Workplace" at New Delhi from 7th to 10th April 1991.

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(ii). Safety in the Use of Chemicals at Work.
(iii). Priority Issues and Action for the 90s.

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PROPOSAL TO DOUBLE CAPACITY OF NFL'S VIJAIPUR PLANT

A working group constituted by th Department of Fertiliser had recommended the doubling of capacity of th gas based fertiliser plant of Nationa Fertilisers Ltd. (NFL) at Vijaipur as on of the projects for the Eighth Plan.

The capital cost of the expansion project is tentatively estimated at Rs. 64 crore, and compared to a grass roo plant, the proposed expansion woul result in saving of about Rs. 150 cror in capital cost.

A rapid wrap-up of what's new in Operations, Processes and Products

Chemical Engineering (CE): Key to the growth of the Chemical Process Industries (CPI)

R. Landau, who spearheaded Scientific Design Co. which developed many innovative processes including that for ethylene oxide, epoxidation with hydroperoxides, etc., has given a fascinating panoramic view of Chemical Engineering and its essential role in the growth of the CPI. Landau is an alumnus of M.I.T., U.S.A. and at the time of the centenary celebrations of the first course in CE in the World at M.I.T. in 1988 he had given a fascinating account of CE at M.I.T. and the impact of CE. His presentation is split into several sections; CE: 1888-1920; CE and Petroleum Refining: 1920-1941; The process design firms: Early 1900's-1941; The CI to 1941; The War Years 1941-1946; The Stable decades -- Innovations and Entrepreneurship: 1946-1966; The Turbulent Period: 1966-1981; The Present Era: 1981-1989; The Future.

In this lengthy paper of 39 pages, which should constitute an essential reading for any serious student of the CPI, many vivid descriptions of contributions of individuals and companies are given and often anectodal references are made. (*A.I.Ch.E. Symposium Series* 1990, **86**, No. 274, pp 1-39).

SEPARATIONS

Membranes

Membrane based separations continue to attract attention in view of some inherent advantages offered particularly with reference to mild conditions and lower energy consumption. The development of ultrathin film composite membranes holds the key to further successes. Martin et al have developed a new procedure to make ultra-thin permselective and defect-free membranes which has layer of 3 microns down to 100 nm. This method is applicable to a number of materials that can be synthesised electrochemically e.g. copolymers of divinyl benzene and ethyl vinyl benzene; support like Anopore Al_2O_3 filters is used and polymerization is initiated electrochemically. The support is first coated with a 50 nm layer of gold. (*J. Amer. Chem. Soc.* 1990, **112**, 2458).

Recently Sakata and Kunitaka have reported the synthesis of siloxane networks with a molecular scale thickness from MeSi $(OMe)_3$ using a multilayer cast film of the double chain ammonium amphipile as a molecular template. A new concept of molecular ceramics has been introduced, where we have ceramics with microstructures, that are controlled on molecular scale. (*J. Chem. Soc. Chem. Commun.* 1990, 504).

Biosorption

GADD has given an overview of this subject. As is well known micro-organisms, including bacteria, algae, fungi and yeasts, can accumulate heavy metals and radionuclides with high efficiency. The potential use of biomass for the treatment of toxic and radioactive wastes, and the recovery of valuable metals has been assessed. Biosorption is often reversible by simple physicochemical treatments. The use of dilute acids is often quite effective. If the material on adsorption has magnetic properties then high gradient magnetic separation can be used.

The most well known commercial process is the "AMT-Bioclaim" system. (*Chem. Ind.* 1990, 2 July, 411-420).

Cyclodextrins (CD) for separations

Alpha, beta and gamma CD are torus-shaped cyclic oligosaccharides made up of six, seven, or eight D(+)-glupyranose units, respectively. These are now commercially available through the enzymatic degradation of starch and the beta variety is reasonably priced. Sybilska and Zukowski have given an exhaustive account of how CD can be used for analytical purposes in HPLC for enantiomers determination. Examples of separations include babiturates and hydantoins; succinimides and glutethimide etc. Thus the course of administration of racemic methylphenobarbital in human body via the urine was tracked; S-enantiomer was metabolised much faster or excreted more slowly than that of the R-configuration. (Sybilska, D and Zukowski, J., in "Chiral Separations by HPLC" Ed. A.N. Krstulovic, Ellis Herwood Ltd., Chichester 1989).

Multiphase reactors: Measurement of gas-liquid mass transfer coefficients

Lee and Foster have reviewed the literature on $k_L a$ and interfacial area in sparged and mechanically agitated (including gas inducing impellers) contactors (MAC). In the sparged reactors the effect of gas superficial velocity, column dia., sparger design, etc. has been discussed.

In the case of MAC initial and double response methods to measure k_La have been reviewed. The effect of solid particles on k_La and a in above reactors has been analysed. (*Applied Catalysis* 1990, **63**, 1-36).

Joshi, Shah and co-workers have reviewed the literature on measurement of hydrodynamic paramters in multiphase sparged reactors. (*Reviews in Chem. Eng.* 1990, **6**, No. 2-3, 74-226).

Formanilide via azeotropic distillation

It has been claimed that formic acid can be reacted with aniline, in the presence of 1,2-dichloroethane (DCE) and water is removed azeotropically and DCE is recycled; condenser is operated at 10°C. (E. Pat. Appl. 361,839, April 1990, *Chem. Abstr.* 1990, **113**, 61718).

Disproportionation of bisphenols

Bayer has claimed that disproportionation of bisphenols (e.g. bisphenol-A) can be conducted with, say, 2,6-dimethyl phenol, in the presence of acidic ion exchange resins (e.g. Lewatit) and mercaptopropionic acid, at 60°C, to give 3,5-dimethyl-4,4'-dihydroxydiphenyl-2,2 propane, 3,3',5,5'-tetramethyl-4,4'-dihydroxydiphenyl-2,2-propane and 1,1,3,4,6-pentamethyl-3-(3,5-dimethyl-4-hydroxyphenyl)indan-5-ol. (Ger. Offen. DE 3,827,643, Feb. 1990, *Chem. Abstr.* 1990, **113**, 61717).

Ion exchange granules containing carbon fibres

Asahi Chem. Ind. has claimed that durable ion exchange granules containing 5 to 30% carbon fibres (average fibre dia. of 0.02 to 0.05 microns; aspect ratio of 1000) can be prepared in a specified way. (*Chem. Abstr.* 1990, **113**, 62168).

A sweeter product from waste molasses

A new biochemical route to convert molasses to fructose has been developed in USA. Here a 2% solution of molasses is converted to levan — a fructose homopolymer using *Corynebacterium laevaniformans* — a prolific producer of the enzyme *Levan sucrase*. Levan can be hydrolysed to fructose monomer; levan itself by industrial uses. (*Chem. Eng.* 1990, **97**, No. 8 (Aug.) p. 21).

A biological route for upgrading low-grade phosphate rock ores

A specially selected bacterium, dubbed E37 is grown in a CSTR to the desired cell density. A slurry of ground apatite is then treated with the above microorganism when 60 to 80% of the ore is solubilized. (*Chem. Eng.* 1990, **97**, No. 8 (Aug.) p. 21).

Ortho-Alkylation of arylamines

Air Products (of USA) have several patents for selective ortho-alkylation of aniline, toluenediamine etc. with olefins like isobutylene. Now a scientific paper has appeared where acid catalysis has been exploited for propylene and isobutylene (for ethylene, aluminium trialkyl can be used as a catalyst). Both homogeneous and heterogeneous catalysts have been investigated. (BF_3; HCl; Triflic acid; Al_2O_3-SiO_2; H-Y-Zeolite). High selectivities have been realised. (*Applied Catalysis*, 1990, **63**, No. 1, p. 117).

Titanosilicate zeolites

Titanosilicate, with Si/Ti ratio of 60, possesses a zeolite-like pentasil structure and this is made in an analogous manner as zeolites by using $Ti(OEt)_4$ and $Si(OEt)_4$ $(Pr)_4NOH$. Recently it has been claimed that H_2O_2, under very mild conditions (temp. = 50°C) oxidises unactivated alkanes. It is even more remarkable that selectivity with reference to straight chain alkanes is very high and 2,2-dimethylbutane hardly reacts and cyclohexane shows a rate very low compared to that of hexane. (Takashi, T. **et al** *J.C.S. Chem. Commun.* 1990, 476; U.K.P. Appln. GB 2071071).

Conversion of dilute alcohol directly to ethylene

It has been claimed that the directly distilled product from fermentation broth can be converted to ethylene with H-ZSM-5 zeolite catalyst, with a Si/Al ratio of 5 to 15 and impregnated with triflic acid and mixed with bentonite clay, at 170-225°C. (*Chem. Abstr.* 1990, **112**, 157654).

1-(4-Isobutyl phenyl) ethanol (IBPE)

IBPE, a precursor, for Ibuprofen (obtained via carbonylation) can be made by hydrogenation of 4-isobutyl acetophenone, without a solvent, using a Ni sponge catalyst (25-45 micron size) at 60°C and about 18 atm. pressure. (Hoechst-Celanese EP Appln. 358,420, March 1990; *Chem. Abstr.* 1990. **113**, 77897).

Phenol and aniline from benzene

Mitsui-Toatsu have claimed a novel route where benzene, water and ammonia are reacted at 450°C with Cu based catalyst, to give aniline and phenol. At 6.2% conversion of benzene, 4.1% phenol and 1.9% aniline are claimed. (Jap. Pat. 0283364, March 1990, *Chem. Abstr.* 1990, **113**, 77908).

Hydrogenation in a two-phase system for unsaturated aldehydes

Rhone-Poulenc have claimed that cinnamaldehyde for instance, can be hydrogenated in toluene-water system, with Rh based ligand and tri(-m-sulphophenyl) phosphine as a catalyst, to give $PhCH_2CH_2CHO$ in 94% yield. (E.P. Appl. 302,637, April 1990, *Chem. Abstr.* 1990, **113,** 77911).

Ammonia removal from water using microporous hollow fibre (MPHF)

Cussler and co-workers have successfully used MPHF contactor for the removal of dissolved ammonia from water; concentrations as high as 500 mg/litre have been considered. Stripping is done with an acid solution.

Pervaporation

Wesslein **et al** have used polyvinyl alcohol membrane for 11 binary systems of organics-water, with complete and partial miscibility (e.g. EtOH-Water; Acetone-Water; Diisopropylether-Water; EtPAc-Water, etc.) Pervaporation was found to be an effective method. (*J. Membrane Sci.* 1990, **51,** 169).

Kang **et al** have studied water-ethanol mixture with cross-linked PVA membranes. Surface of the crosslinked membrane were modified by reaction with chloroacetic acid. This technique was found to be useful. (*ibid*, 215).

Jet Loop Reactor (JLR)

JLR are very versatile and can be used for semi-batch as well as continuous modes of operations; k_La values offered by JLR are very attractive and can approach as high as 1.05. Dirix and van der Wiele have made a study in a liquid driven jet ejector. The desorption of dissolved O_2 by air was used as a model system to obtain k_L**2.** It is necessary, for a proper design, to split the JLR into the ejector section and the vessel. (*Chem. Eng. Sci.* 1990, **45,** No. 8, 2333).

Removal of organic compounds from water by solvent sublation

Shin and Coughlin have shown that rates of air stripping of dissolved volatile organic compounds in water, under certain circumstances, can be enhanced by the addition of a second immiscible liquid phase. Experiments were carried out with toluene dissolved in water and distinctly higher rates of desorption were observed. (*J. Colloid and Interface Sci.* 1990, 138, No. 1, 105-112).

Macro-mixing and micro-mixing in a stirred tank reactor: Effect of suspended fibres

Bennington and Bourne have studied this problem with the model reaction of 1-naphthol with diazotised sulphanilic acid; the extent of the formation of mono- and *bis* substituted reaction products gives the quality of mixing. Nylon fibres (2 to 3 mm in length) and fully bleached soft wood Kraft pulp were used as fibres. Suspended fibres were found to increase the macromixing blend time. Continued increase in the fibre concentration led to the formation of a well mixed cavern centered on the impeller and the creation of stagnant regions adjacent to the vessel walls. It is good to add the reactant in the impeller vicinity. (*Chem. Eng. Commun.* 1990, 92, 183).

Fine Magnetic particles by oxidation of aqueous suspensions of ferrous hydroxide

Sada **et al** have studied this problem in a bubble column reactor, equipped with an internal concentric draft tube. The reaction was found to be first order in dissolved oxygen. The overall process consists of two steps; (1) a ferric hydroxide-complex is formed by oxidation of ferrous complex ion in the liquid film (2) magnetite is formed by co-precipitation reaction between ferrous complex and ferric hydroxo- complex and this occurs around the ultrafine ferrous hydroxide particles in the bulk of suspension medium. (*Can. J. Chem. Eng.* 1990, **68,** 622).

Removal of fine particles from aq. medium by flotation

In the treatment of effluents, containing fine suspended particles, flotation technique is employed for the removal of particles. Kubota **et al** have used the model system of barium sulphate with sodium dodecylbenzene sulphonate as the surfactant. A mechanism has been suggested. An electrophoresis method was used to measure the zeta potential. (*Can. J. Chem. Eng.* 1990, **68,** 608).

Benzyl alcohol from benzyl chloride: Phase Transfer Catalysis (PTC)

Wang **et al** have shown that PTC is useful with benzyltrialkylammonium chloride. The effect of the size of the alkyl group, the pH, conc. of NaOH, stirring speed, etc. on the rate was studied along with the role of co-catalyst like sodium formate/acetate. Under optimal conditions 95% yield of benzyl alcohol can be obtained in 3 hours. (*Chem. Eng. Commun.* 1990, **92,** 139).

Oils and fats go to market

Gunstone has given a very useful brief account of this subject. In 1987 the World production of oils and fats was about 72 mtpa (mostly of vegetable origin). During 1998-2002 the annual production should be about 105 mt. Soyabean, palm, sunflower and rape together would constitute above 62% of the total production. Rape has witnessed spectacular increase (from 1.1 mtpa in 1958-62 to 8.3 in 1988-92). Attempts are being made to have biotechnological modification of rape so that its seed oil has a fatty acid composition similar to that of coconut. The domestication of wild species *cophea* which are very rich in C_8-C_{14} has also been considered.

Developments in large scale chromatography are being exploited to produce 'pure lipids' from natural sources.

Health promoting oils are gaining importance and evening primrose seed oil, which give gamma linolenic acid, is attracting attention. *(Chem. Brit.* 1990, **26,** June, 569).

Ethylene oxide (EO)

A series of papers in a recent issue of Plant/Operations Progress of the *A.I.Ch.E.* (1990, No. 2, pp. 67-107) deals with different aspects of EO like explosive decomposition of EO, thermal stability and deflagration of EO, exposure control in ethoxylation industries, etc.

Fluorine based chemicals

Fluorine in view of its small size and high electronegativity confers special properties on organic molecules; C-F bond is very strong and has high thermal stability. Fluorobenzene is typically made via diazotization of aniline in the presence of HBF_4 or in the more modern plants, in a continuous reactor with $NaNO_2$ + HF. Halex process is used for 'active' Cl to be replaced by F with KF e.g. *p*-nitrochlorobenzene to *p*-nitrofluorobenzene. Side-chain fluorinated compounds are prepared either by fluorination of polyhaloalkyl aromatics or by trichloromethylation with concomittant fluorination to the desired trifluoromethyl compound.

In recent years fluorinated agrochemicals, such as Trifluralin; Fentrifanil; Fusilade; etc. have made an impact and fluorinated pharmaceuticals have also made a dent. Fluorinated surfactants are speciality products and have exceptional properties. (*Performance Chem.*, 1990, August/Sept. p. 36).

Highly enantiomerically pure 1,2-epoxyaldehydes, epoxy alcohols, etc.: Enzymatic processes

Optically active 1,2-epoxides are useful building blocks in organic synthetics. Pederson **et al** have described a simple and practical chemoenzymatic route to highly enantiomerically pure epoxy aldehydes and epoxy alcohols and use of these epoxides for the synthesis of other enantiomerically pure compounds. (*J. Org. Chem.* 1990, 55, 4897).

Alkylation of isobutane with butene

There is increasing interest in replacing the HF catalysed process by solid catalysts which do not pose a hazard. In a Japanese Patent the use of H_2SO_4/ZrO_2-Al_2O_3 at 400°C and 30 atm. pressure has been claimed. (*Chem. Abstr.* 1990, **113,** 39915).

Oxo reaction: Water soluble catalyst

Union Carbide have claimed water soluble catalyst based on cobalt complexed with phosphines can be used for converting dedecene to tridecanol. Thus *iso*$Pr_2PCH_2CH_2CH_2$-SO_3Na was used. (E.P. 350,921 of Jan. 1990, *Chem. Abstr.* 1990, **113,** 42795).

Electrochemical synthesis of adiponitrile (ADN) from acrylonitrile (ACN)

The cathodic reduction of ACN to ADN is the largest scale organic process based on an electrochemical route. Scott and Hayati have made a systematic study of the role of different factors, including current density, effect of dispersed gas on mass transfer, etc. on the yield of ADN. This multiphase reactor is quite complex and mass transfer factors are important. Increasing both current density and k_L2 increase and decrease, respectively, the yield of ADN and trimeric product. (*Chem. Eng. Sci.* 1990, **45,** 2341).

Transalkylation of Bisphenol A with diphenyloxide (DPO)

Wang **et al** have taken note of the earlier work of Olah **et al** of transalkylation of *p-tert*-phenol with an excess of toluene, in the presence of Nafion H as a catalyst under refluxing conditions, to give phenol + *p-tert*-butyl toluene (diphenyl can also be used). It has been shown that at room temperature and in the presence of methanesulfonic acid, bisphenol A and DPO undergo transalkylation. (*J. Org. Chem.* 1990, **55,** 4966).

Mordenite as shape-selective catalyst

Garces and Lee (of Dow Chem. Co., USA) have shown that the naturally occurring mordenite clay can be converted to a shape selective catalyst via dealumination. The liquid phase alkylation of diphenyl with propylene gives *para-para* alkylated product. The procedure for dealumination is given. (*Chem. Eng. News*, 1990, 6 Aug. p. 23).

Oxidation of cyclohexane: Use of water

Asahi Chem. Co. (of Japan) has claimed that, in the presence of water, the oxidation of cyclohexane gives predominantly cyclohexanol (and **not** a mixture of cyclohexanone and cyclohexanol). (*Chem. Week*, 1990, 25 July, p. 8).

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OPOSED GAS PRICES TO HIT FERTILISER COS

Rs. 440 crore extra burden likely

he increase in gas price is recomnded by the Kelkar committee will ease fertiliser production cost by 700 crore over a three-year period ing March 31, 1993. The financial den on fertiliser industry would ount to Rs. 440 crore, according to Fertiliser Association of India (FAI).

The Kelkar committee on gas pricing, its report submitted to the petroleum nistry in May 1990, has recomnded an annual increase in gas price Rs. 200 per 1,000 standard cubic tres (SCM) for three consecutive ars ending 1992-93.

Noting that any increase in adminised price of inputs contributes to source generation only when it is paid r by the ultimate consumer, FAI says at as the farmer does not pay for creased cost of fertiliser production, e rise in gas price leads to a ''corresnding resource loss from the treary''. This is on account of increased yment of fertiliser subsidy under the tention pricing scheme (RPS). On the rface, it may appear that the fertiliser dustry has nothing to lose from the gas ice hike as the burden has to be borne the farmer or by the government.

Notwithstanding these facts, the dustry suffers from the hike in input ices. In the case of the last gas price crease effected in February 1987, the dustry was compensated 20 months ter the hike. This delay caused seriis liquidity problems for the industry. oreover, loss of interest on delayed mpensation affected its profitability. similar situation will repeat and perps, with greater frequency', FAI adds.

It has also pointed out that the fertiser industry has suffered heavil during e last four years due to the inordinate lay in the release of outstanding dues d cost escalation claims by the govnment due to budgetary constraints. With the resource constraints becoming even more severe now, the impact will be even greater.

The burden on the industry in 1993-94 will amount to Rs. 920 crore, it adds. FAI has quoted a pres report as saying that the ministry has proposed to increase the gas price from the present Rs. 1,400 to Rs. 2,500 per 1,000 SCM at landfall point and increase the gas transportation cost from Rs. 850 to Rs.1,219 per 1,000 SCM. The association says that the proposed price hike, coming as it does after the 400 per cent increase effected in February, 1987, is clearly tantamount to a negation of the government's commitment.

FAI says that with the govenment deciding the feedstock policy and the availability of hydrocarbons other than gas being a serious limitation, the question of inter-fuel substitution is ''irrelevant''. With the Gulf crisis, the possibility of using naphtha and fuel has diminished further. Against this background, to surmise that naphtha and/or fuel oil represent the opportunity cost or for that matter the capability of the consumer to pay is ''unjust and illogical''.

WEST ASIA CRISIS MAY HIT NAPHTHA-BASED FERTILISER UNITS

Several fertiliser plants in the country, using naphtha as feedstock, are likely to face a massive cost escalation as a result of the crisis in West Asia. Naphtha prices have so far not been increased, since it is an administered price which is adjusted through a pool pricing mechanism by the ministry of petroleum and chemicals. However, industry sources say that with the prices of crude oil increasing rapidly, a revision is just around the corner. At present crude prices in the international spot market is in the region of $ 31 a barrel.

Annual consumption of naphtha within the country by industries, the bulk of them being the fertiliser sector, is in the region of 3.13 million tonnes whereas annual output of naphtha from all the refineries in the country is in the region of 5.4 million tonnes.

The surplus naphtha is exported. The capacity of fertiliser units using naphtha as feedstock is 2.5 million tonnes of nitrogen per annum. Naphtha cracker plants account for about 30.4 per cent of the total fertiliser output in the country, the remaining is from coal, lignite, furnace oil and gas based cracker plants and from imported ammonia based plants.

Five of these plants — Madras Fertilisers Limited (MRL), Fertilisers and Chemicals Travancore (FACT), Fertiliser Corporation of India (FCI) and the Hindustan Fertiliser Corporation(HFC) — are in the public sector. The remaining are in joint and cooperative sector. Refinery sources ruled out any immediate shortage of feedstock for these plants, since only about 20 million tonnes of crude oil is imported for fertiliser production, though to maintain it some feedstock would have to come from imported oil.

But what is worrying the fertiliser industry is the effect of such a cost increase on profitability. FACT and MRL are the only profit-making public sector units. The other public sector units using this feedstock have been running up losses. The oil price increases have made economics in favour of gas as feedstock, since gas resources are abundant in the country, though the immediate costs of such conversion was bound to be quite substantial. The investment costs are also bound to be higher for fertiliser units located far from the gas source. But for balancing costs, an Engineers India Ltd. official said, investment for setting up gas handling installation and plant modification, costs range between Rs. 50 to Rs. 200 crore depending on the size of the plant.

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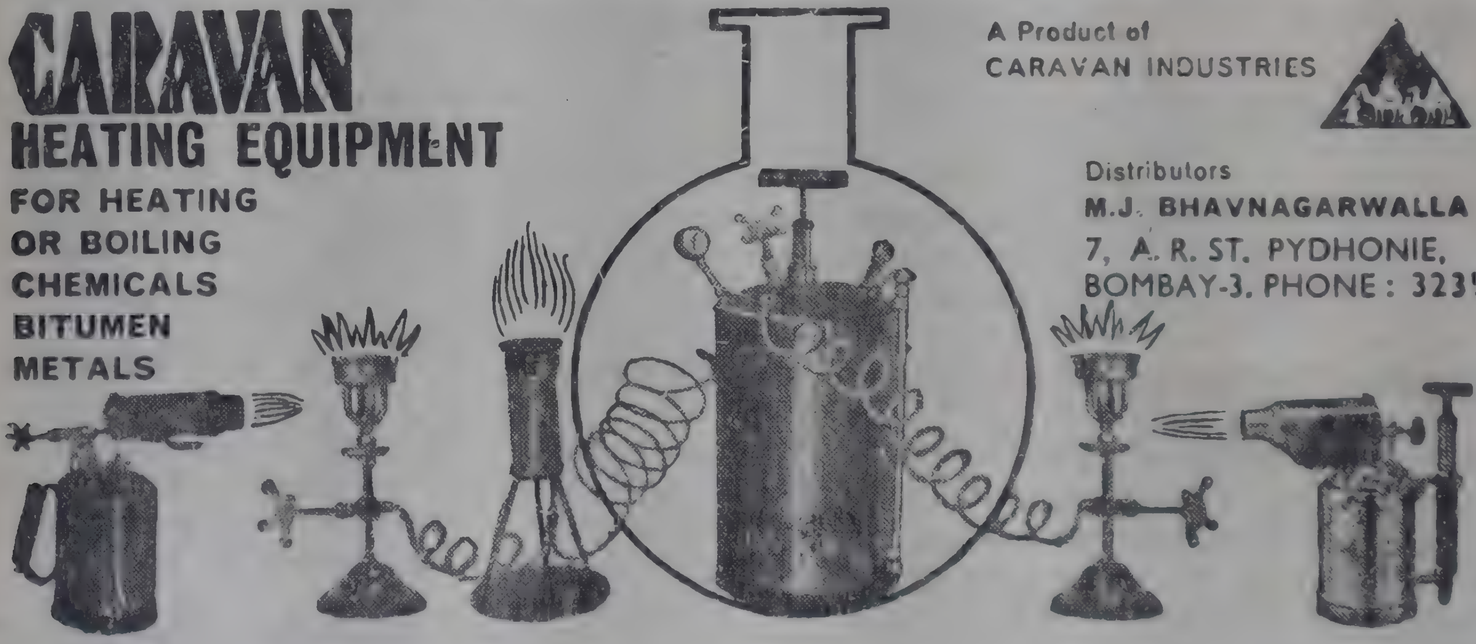

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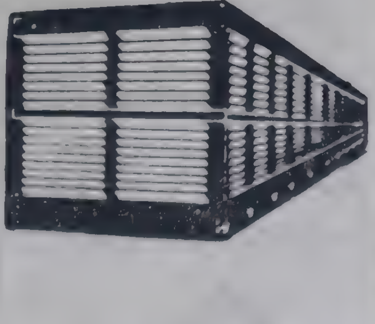

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ERCOMING OIL CRISIS

Experts favour long-term steps

'he government should adopt long- n measures to stave off the impact he Gulf crisis leading to shortage of supplies instead of adopting "fire nting" measures like crash pro- mmes of "petrol conservation", rgy and oil experts opined.

The oil crisis and upsurge in prices uld have been anticipated and pre- tive policy measures should have n taken, the experts attending a sem- r on "Energy scenario" organised by ancial Express at New Delhi said.

The oil crisis is not likely to end with improvement in the situation in the lf but its impact would be long there cope up with, the experts said.

As the oil crisis was bound to have impact on the infrastructure sector, re could be an energy crisis in the untry, they warned.

Dr. R.K. Pachauri, Director of the ta Energy Research Institute, said gh diplomatic initiatives could fuse the tense situation in the Gulf, t prices would still rule high and not me below the $25 a barrel mark.

A prolonged cold war situation in the lf could push up prices to over $ 30 arrel, putting tremendous pressure on world economy including India's ere the oil import bill would be shed up.

Any outbreak of war, he said, would ve unpredictable consequences. wait and Iraq have between them 200 lion barrels reserve and Saudi Arabia 5 billion barrels.

Col S.P. Wahi, former Chairman of Oil and Natural Gas Commission, d the oil crisis created by the Gulf sit- ion was certainly not the first and last sis. Its impact would be long felt and world was moving towards a difficult oil supply scenario.

The only long-term solution was to move away from oil as the prime source of energy, he said. Col Wahi said in the absence of an integrated national energy plan the development of various energy sources in a balanced manner suffered.

Use of oil as a swing fuel to meet the shortage and indifferent supply of other energy sources like coal and electric power has made the country's economic growth very vulnerable to uncertain world oil supply and price situation, Col Wahi observed.

The West Asian crisis has brought into focus demand management and efficient use of energy, he said pointing out that industrial economics, after the oil crisis in 1973 and 1979, now use less than 40 per cent oil than they did earlier to produce a real dollar of GNP.

Deliberate demand management strategies have to be formulated to discourage consumption of oil and not by hasty'fire fighting' actions, he said referring to the petroleum conservation measures launched by the Government.

Administrative bottlenecks had also resulted in the country flaring Rs. 6600 crores worth natural gas unproductively. If used by industries this could add to the profits of the oil companies, he said.

Mr. Chudamani Ratnam, Chairman and Managing Director of Oil India Ltd., painted a grim picture of oil supplies and asked where the energy was going to come from.

The per capita reserve of coal in India for all time to come was just 1766 tonnes against 20,000 tonnes in the USSR and 13,000 tonnes in the US and 1,000 tonnes in China.

The per capita reserve of oil was a bare 0.78 tonne against 16 tonnes of the US. Dr. S. Varadarajan, former Chairman of IPCL, talked of a more serious law and order problem if the energy supplies needed by the Government could not be made available.

Oil prices will continue to remain high he said. In the long run, he felt, Government controls over the energy sector had to go and there was need for an independent authority for energy.

Mr. K.L. Puri, former Chairman of BHEL and energy advisor to the Government, said the Centre has to set up a high level apex committee to deal with matters of energy management and conservation.

Mr. A.M. Khusro, Editor of 'Financial Express', who moderated the seminar, said the Government should be alive to the magnitude of the energy crisis and its policy formulations to deal with the situation would have to be better.

Political leadership will have to propagate ideas to deal with issues relating to energy, he said.

Incentives would have to be given to those coming out with energy efficient technologies, he said.

COMMISSIONING OF DPL COKE OVEN BATTERY DELAYED

The non-availability of coking coal has forced Durgapur Projects Limited to put off the commissioning of its second coke oven battery.

A senior official of the plant said the second coke oven battery, which was rebuilt at a cost of Rs. 25 crore, was scheduled to be commissioned in the first week of August but now this would not be possible before December. The delay in commissioning the battery will affect the economy of the plant whose losses have been mounting.

Soviet oil output decline adds to world worries

Independently of the Gulf crisis, which has taken some 4.6 million barrels of oil a day off the world market, oil production in the Soviet Union has fallen by more than half a million barrels a day since last year and is likely to continue declining, according to analysts in the United States and Europe.

In a roundabout way this is amplifying the effect of the Middle East crisis on some importing nations, and even on the price of gasoline in the United States, experts say, because the regional markets for crude and refined products are interconnected.

Soviet production is running lower by 500,000 to 600,000 barrles a day, or 4 to 5 per cent, and exports are down about 250,000 barrels a day, according to the International Energy Agency, a monitoring agency for the industrialised nations; some put the export decline higher.

Part of the shortfall is made up by declining demand in the Soviet Union itself, which is in recession. In addition, early this year Moscow stopped its worldwide marketing of Iraqi oil, which it had received in exchange for arms shipments, according to experts.

The Soviet Union's own exports will average about 3.3 million barrels a day this year, down from 3.7 million barrels a day last year, according to Mr. Robert E. Ebel, the vice president for international affairs of Enserch Corp., of Dallas. Mr. Ebel, a former government intelligence officer said that in 1988 exports reached 4.1 million barrels a day.

East European countries that took about half the Soviet exports, paying for them through barter or in non-convertible currencies, have borne the brunt of the export cuts, according to Western experts. They were also major users and processors of Iraqi oil, generally acquired by barter.

There is also some reduction in sales of Soviet crude to Western European countries, which paid in hard currency, but Soviet oil income could still rise because the price per barrel is up sharply.

The United States produces about 8.5 million barrels a day of crude oil and condensates, but it buys about the same amount it produces, in normal times.

Compared with these numbers, the Soviet declines are small, but they come at a time of tightness in the market. The Iraqi barter with the Soviet Union ended early this year, before the Kuwait invasion.

Mr. Robert Mabro, director of the Oxford Institute for Energy Studies, said that the Iraqis had been paying for "arms, flour, tractors, whatever", and that none of the oil actually went to the Soviet Union; it was simply sold or rebartered. Western experts are not sure why the barter stopped; one suggested it was because a debt had been paid.

With demand heightened by tourism and other factors, Eastern European countries like Yugoslavia and Bulgaria, which were large users of Iraqi oil either through direct barter or through the Soviet Union, are importing refined products, adding to the pressure on western European refineries, according to Western experts.

And oil traders in New York say the demand for gasoline in Europe is so strong now that some cargoes have gone from the Gulf Coast of the United States to northwestern Europe, opposite the normal flow, driving up domestic prices.

Moscow was also channeling 90,000 barrels a day of Iraqi oil to India, and is reportedly making that up from domestic production.

With that diversion and the general decline in Soviet output, deliveries to Eastern Europe are down by 30 per cent, by some estimates. The main reason for the decline in Soviet production is a decision early last year to decrease investment in the oil industry, in favour of investment that could put consumer products on store shelves.

The oil and gas sectors had soaked up 70 per cent of the new investment capital available in the late 1980s, according to Thane Gustafson, a professor of government at Georgetown University and an expert on the Soviet oil industry. When production began to drop in 1985, he said, "Their response was to throw money at the problem. But this time they've decided explicitly not to do it again. The Soviets have said they will let oil output fall".

Mr. Mehdi Varzi, an oil expert at Kleinwort Grienveson Securities, in London, pointed out that Soviet production peaked in 1988, before the unrest in Azerbaijan, site of much of the oil service industry, and before the restiveness of other republics and the genera breakdown of the economy.

"They really haven't undertaken the necessary measures in maintenance well workovers, replacement of equipment and so forth, what is normall called good industry practice", said M Varzi.

The Soviet ministry of geology an the government of the Turkmen Republic announced recently, that they woul open about 90,000 square kilometr (35,000 square miles) to exploration b Western companies. "They have n developed a technical base for drillin deep for oil", said Mr. Ebel. Rather th drill below 10,000 feet (3,000 metre he said, they moved on to other fields, but now they have run out of n fields.

Polymers can help petroleum industry'

Dr. R.A. Mashelkar, a polymer sci-
ist and Director of National Chem-
l Laboratory (NCL), unfolded the
esome potentials of polymers, some
which have the capacity to usher in
nificant reforms in the Indian petrol-
n industry.

Polymers, a quaint type of material
h inherent various and plastic prop-
es, have fascinated scientists across
globe as its possible applications in
ry day life are mind-boggling. The
ymer scientist, addressing a colloq-
m of the Inter University Centre for
ronomy and Astrophysics (IUCAA)
une, said that polymers considerably
ance the flow rate of petroleum pro-
ts passing through pipelines.

The Indian petroleum industry which
duced petroleum around 20 million
nes of oil had been unable to increase
duction due to non-availability of
itional infrastructure. Enhancing the
v rate of oil through pipelines could
uce the crisis, at least to a certain
ent, he indicated.

he introduction of a certain polymer
he oil while passing them through
eline could reduce friction by a
arkable 30 to 40 per cent, he
ealed. Dr. Mashelkar, on the occa-
, described to the audience the often
ny and bizarre' but useful proper-
of polymers, which he described as
scoelastic fluid. It was thus branded
use certain materials displayed
erties of both liquid as well as solid.
lumn of the material could be cut
a solid, but at the same time it could
like a liquid, he explained.

e NCL, he informed was working
ertain polymers, including the one
h could be used by the petroleum
stry. However, he said that they had
o make a firm breakthrough in this
d. Apart from this particular appli-
, polymers had the latent poten-
cause upheavals in other fields too
ling aviation, industry and even
agriculture.

Its application in the aviation industry, he said, could go a long way in preventing major accidents, and thus reducing the number of deaths considerably. Air crashes often turn gory due to the explosion of aviation fuel tanks in aircrafts.

A special polymer, when added to aviation fuel, prevents it from blowing up on impact. Instead, the fuel 'rolls' out harmlessly from fractured tanks, Dr. Mashelkar said.

Clearing of oil spills on the oceans and production of high impact resistance plastics are other areas where polymers played a major role, Dr. Mashelkar told the audience. Several prominent scientists from Pune including Prof. Jayant Narlikar, Director of IUCAA and Prof. Govind Swarup, Director of the Giant Metrewave Radio Telescope (GMRT) were present on the occasion.

MRL SIGNS MoU WITH GOVT.

Madras Refineries Limited (MRL) has signed a memorandum of understanding with the Union ministry of petroleum. The MoU confers more on the MRL board in respect of certain capital investments.

The company will also enjoy special powers relating to foreign exchange commitment and utilisation. The MOU has stressed cost-effective higher capacity utilisation, energy saving, efficient use of working capital and diversification. It has also fixed performance targets for 1990-91, including physical operations, financial performance and project implementation as well as other aspects like human resource development and social welfare measures. The MOU has spelled out the various assistance to be extended by the government to MRL.

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PETROLEUM CRISIS

Bengal govt. seeks to promote coal gas

The West Bengal government had decided to "pressurise" the industries to seek alternative fuels to petroleum and electricity. One such alternative source of energy could be coal gas. In fact, at a meeting on September 9 between representatives of different industries and state government officials, the former were reminded of the state government's incentive to provide 25 per cent subsidy for conversion of plants from the use of electricity or petroleum products to coal gas.

Mr. T.C. Dutt, chief secretary of the West Bengal government said that the government first thought of merely promoting the use of coal gas. But since scarcity of petroleum products was acute and availability of electricity poor, the government had no option but to put "some pressure" on industries to switch over to the use of coal gas. The Tatas, Mr. Dutt said, had already decided to stop the use of transport fuel for their plants. The state government was having discussions with the CESE for the conversions.

According to Mr. Dutt, the country was spending Rs. 900 crores worth of foreign exchange every year for importing petroleum products. There has been no major oil find in the country during the last ten years. The demand for petroleum was going up at the rate of 12 per cent every year.

In such a situation, Mr. Dutt felt, the government in any other country would have compelled the industries to use alternative fuel through legislation. He admitted that it was not always easy to convert machinery and adapt them to the change of fuel. But in extraordinary circumstances, the industries must also try to adopt themselves for the change.

The Union government had invested over Rs. 150 crores for setting up of the coal gas plant in Dankuni and state government another Rs. 55 crores for its distribution through the Greater Calcutta Gas Supply Corporation. Mr. Dutt admitted that the cost of the coal gas was not as cheap as it was expected. But Coal India had agreed to supply the gas at a reasonably low price. The cost of gas for industrial units has been fixed at Rs. 148 a therm while for domestic consumers at Rs. 10 a therm. Dr. Bikram Sirkar, industry secretary said that the gas was pollution free which should be an added incentive to the industries to accept it for consumption. He admitted that the implementation of the project was delayed. But it would prove efficient and even economical in the long run if the state governments' incentives and the pollution cess were taken into account.

Some of the representatives of the industries however complained about the gaslines which they said were not complete in many areas.

ASSAM'S SECOND REFINERY PROJECT REPORT UNDER WAY

A detailed project report (DPR) is being prepared for setting up a second refinery in Assam. The DPR will be placed before the Public Investment Board (PIB) for clearance, after the environment ministry's approval for which a meeting was held between the central and state government representatives.

This was disclosed by an official spokesman of the Union government while briefing newsmen on the outcome of a review of the implementation of the Assam accord at New Delhi on September 9th. The review was attended by the Prime Minister Mr. V.P. Singh, and the state chief minister, Mr. Prafulla Kumar Mahanta. The chief minister was assisted by Mr. B.K. Phukan, home minister, Mr. S.N. Medhi, law minister, Mr. Biraj Sarma, senior

G. Hazarika, industries minister,
Durga Das Boro, minister of state
home, Mr. H.N. Das, chief secreta
Assam and other senior officials.

The Government of India was rep
sented by Mr. Mufti Mohamm
Sayeed, union home minister,
Madhu Dandavate, union finance mi
ter, Mr. M.S. Gurupadswamy, un
petroleum minister, Mr. Dinesh G
wami, union law and justice minis
among others.

The Centre also disclosed a decis
to set up a second non-affiliating c
tral university at Tezpur. A central te
will visit Assam shortly to finalise
site for an IIT at Silghat in Naogaon
trict. The prime minister is likely to
the foundation stone during his n
visit to Assam.

The Assam government's views'
the L.C. Jain committee report
submitted to the central government
the government of India is expected
finalise its decision after its detai
examination.

The Government of Assam pres
for the preparation of a national re
ter of citizens. The Government of I
assured that this would be examin

It was decided that a separate m
ing between the central and state
ernments at the minister's level w
be held soon to consider the prop
of constitutional safeguards of
Assamese people.

GAS TURBINE PROJECT: T
PROPOSAL CLEARED

The Centre has cleared Tamil
Electricity Board's proposal to se
Rs. 22.25-crore gas turbine pla
Vengidangal village in Thanjavu
trict. To be known as Narimanan
Turbine Project, the plant will hav
units of five mw capacity each an
erate about 65.70 million units of

Private sector participation in oil industry stressed

Exploration and fruitful exploitation f our natural oil and gas resources hould be thrown open to private sector o supplementing the efforts of ONGC. This was advocated by Mr. Suren Shsi, President of the Gujarat Mineral Indus- ry Association, while addressing a western regional mineral convention.

He pointed out that it has become necessary in the context of current industrial scenario of petroleum products for which our country is spending substantial foreign exchange on its imports. He pointed out that at a time when we are on the threshold of 21st century it is the irony of the situation and regrettable also that the Government has till date not recognised mining as an industry, while on the other hand the Central Government is thinking of declaring agriculture, road building and tourism as an industry. He requested the Central Government to declare mining as an industry so that we can celebrate 1990 as year of mining industry.

According to Mr. Choksi, the Indian Forest Conservation Act, 1980 together with as many as 90 amendments put hurdles and delay in the grant of mineral concession in forest land. The main reason is unrealistic approach on the part of the establishment. The interpretation of each amendment coupled with the unrealistic approach has restricted the development of mining activities even in areas which are not forest areas. The Act has also challenged the existence of the established and running mines as it has come in the way of renewal of leases.

He stated that mining and mineral industry is capable to meet the challenges of fast growing demands of the industry and export market. Minerals like bauxite, chinaclay, limestone, dolomite, iron ore, mangenese, magnesite and chromite have wide scope of development. Only the blessings and encouragement from the administration are required. Since independence the Central Government has been announcing the policy of decentralisation time and again without implementing the same. Though on popular level, in actual practice the working is quite to the contrary as even absolute rights of the State Government are being curtailed.

He reminded that though the recent amendment in the Mineral Concession Rules, 1960 and MMRD Act, 1948 the function of the State Government is only to act as a postman. In fact, even for granting mineral concession for ordinary minerals like limestone, dolomite, the consent and approval of the Central Government is a must. He suggested that all the State Government and their administrative depts., federation and association should unite to ensure that power to grant mineral concession is given back to the respective State Governments once again.

Considering the international requirements and technological development, market for low grade and waste mining material has also a demand for export. The national policy for export of minerals should have a practical approach: and instead of putting a ban on low grade minerals such as bauxite, iron ore, magnesite, manganese etc. which have no better utility except for dumping, these should be allowed to be exported. Although the Centre has decided in principle to extend the benefit of 100 per cent EOUs to mining project as far back as in September, 1987, no practical step has been taken till date.

Mr. N.L. Rungta President, Federation of Indian Mineral Industries (FIMI) stated that western region of the country is rich in a variety of minerals and is already making significant contribution to meeting the demands of the manufacturing sector and of various industries contribution of western regi in the export trade of minerals are co fined to bauxite, bentonite, felspar, som quantity of gypsum, sandstone, marb and wollastonite.

The region has, however, tremendo potential to increase exports of both ra and finished minerals and mineral pr ducts. This, according to him, wou require strengthening of infrastructur reasonably good handling facilities the ports, relaxation in the conditions the leases by some of the State Gover ment of western region and conce sional railway freight fiscal incentive

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FIRST HALDIA DOWNSTRAM UNIT GOES TO G.P. GOENKA

Haldia Petrochemicals Ltd. h decided on its first downstream proje The Rs. 150 crore SBS/nitrile rubb unit goes to Mr. G.P. Goenka. This w be a private sector unit to be set up wi styrene and butadiene available for me chant sale from the Rs. 300 crore joi sector project due to come up in t joint sector between the WBIDC a the Tatas. Another company owned Mr. Goenka — Herdillia Chemica Limited in Maharasthra — has a lett of intent for SBS/ nitrile rubber whi will now be transferred to the new u to come up in Haldia. SBS and nitri rubber have many speciality us — from soles for sports shoes to ind strial uses. The outputs are estimated 10,000 tonnes each of SBS and nitri rubber from inputs of 7,500 tonnes styrene and 14,500 tonnes of butadie available from HPC.

HIND LEVER BAGS AWARDS

The government's gold shield f excellence in import substitution h gone to Hindustan Lever.

The award was presented to the co pany's executive director, Mr. P. Sinha, by the secretary, technical de lopment, Mr. H.C. Gandhi, at a functi in Delhi on September 13.

Fibreglass reinforced plastics gain acceptance

Fibreglass reinforced plastics (FRP), which has wide applications in various industries in advanced countries, is slowly being accepted in India as well. The material which is produced from various indigenously available raw materials will also help in preserving the dwindling forests and replacing materials like steel, aluminium etc.

There are now three producers of FRP in the country with a total capacity of about 5,000 tonnes a year. The glass fibre division of Ceat Limited and another company have a capacity of 2,000 tonnes each, while a third company has 1,000 tonnes capacity.

Talking to newsmen in Calcutta, a spokesman of RPG Enterprises (Ceat Limited is a member of the group) said in Calcutta on Sep.6th, that the FRP-producing factory at Hyderabad will shortly increase its capacity from 2,000 tonnes to 4,500 tonnes with technical collaboration of Nittro Boseki of Japan. The modernisation and expansion programme is well in progress and will be completed by the middle of 1991.

A seminar on application of fibreglass reinforced plastics in building and construction sector was organised in Calcutta on Sept 6th by the glass fibre division of Ceat Limited.

The material was first introduced in India in the early sixties though application has picked up only recently, said Mr. M.K Das, area sales manager (east), Ceat Limited. Quoting statistics, he said, the per capital consumption of glass fibres is 2 kg. in West Germany and the US, 1.7 kg. in France, 1.6 kg. in Italy, 1.2 kg, in Japan, 1 kg. in the UK and just 0.005 kg. in India.

Mr. O.P. Malhotra, the chief guest at the seminar, said the industry had achieved an annual growth rate of 18 per cent. With an increasing awareness in India about the advantages of the materials, the potential for growth was limitless as it could substitute timber, aluminium and steel, among other things.

Mr. Santosh Ghosh, chief architect, development and planning, Government of West Bengal, said human civilisation has used three major types of building materials — Bamboo, wood. etc., were the primary types which still have wide use in India. Brick, cement etc. are the conventional types and are used by over 30 per cent Indians. Plastics and similar materials are the most modern building materials which still have a limited application in the country.

A full plastics house is still a few decades away, but increasing building components would be made from plastics materials, he said. This called for an awareness of mutual adjustment of various types of building materials.

The new plastics materials require a proper standardisation. Besides, construction manuals and engineering students must be aware of the continous developments in this area. A small exhibition fo various items made from FRP was also organised at the seminar hall. The items displayed included FRP water tanks, doors, windows, partition walls, furniture, roofing sheets, sanitaryware etc. The prices of these items compared favourably with those made from conventional materials. But the added advantages are that they are not affected by exposure to nature, are light in weight, last long and are easy to repair.

JPMA PETITIONS FOR SPECICAL BENCH

The Supreme Court has referred petitions questioning the constitutional validity of Jute Packaging Material Act (JPMA) to a special bench of three judges "in view of the importance of the cases and the questions raised."

Following the decision, the plastic sack industry, rendered sick at one stroke by the 1986 JPMA, has requested the Supreme Court for an early hearing. Petitions from industry associations from various parts of the country were referred to the Supreme Court and have been pending with the highest court for more than a year.

A majority of the 500 HDPE woven sack units all over the country have become sick, with their net worth eroded. Financial institutions have sunk an estimated Rs. 300 crores in the industry. In view of the plight of the industry following the jute reservation order, individual units have been allowed to approach the banks for rescheduling the loans, each case being decided on merit.

The capacity utilisation is around 40 per cent. Even this is being achieved with the help of cement units all over the country, which, flouting JPMA, have been patronising the plastic woven sack industry. Almost all cement units, except some in the North and East are using plastic packaging because of consumer preference. Another reason is the enormous seepage loss due to jute packaging, a fact attested by reputed bodies like the Indian Institute of Packaging. It is learnt that the government is planning to issue a show cause notice to cement units for flouting JPMA.

The flare up of HDPE price following the Gulf crisis has also affected the fortunes of the industry. Tape-grade HDPE has touched $1050 a tonne and is scarcely available in the market. As prices were on a continuous climb down in the pre-invasion period, traders and consumers are left with very little inventory. This is bound to aggravate the poor capacity utilisation plaguing the industry. Some cement units have raised the purchase price for bags to compensate for the rise in polymer cost.

EAP KOREAN IMPORTS FLOOD MARKET

EPS makers slash prices

A flood of cheap Korean imports has ced Indian producers of expandable lystyrene, a raw material for hermocole'' insulation and electron- packaging, to slash prices by 16 per nt in eight months. BASF India Ltd., leading producer of this speciality lystyrene, reduced its prices from . 48.80 to Rs. 44.40 a kg. in Nov- ber 1989 and to Rs. 41.20 in July 90. Hindustan Polymers, the only her producer, has also cut prices by ore than 15 per cent during the period. oth producers are dependent on ports for part of their requirements of yrene monomer, the raw material. Sty- ne monomer prices have risen from S 0 a tonne in January to $ 1050.

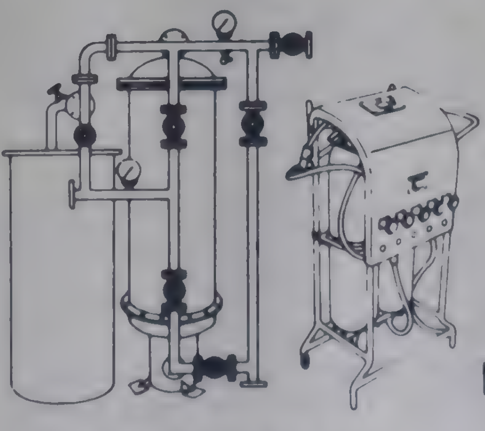
With a Rs. 10 per kg. difference etween the landed price of imported pandable polystyrene (ESP) and the digenous material, many a processor as turned trader, by importing more an required, and selling the balance for tidy profit. The margin is so high that aders are offering long-term credit to uyers. The market has turned chaotic. ne producer said he was running the lant despite losses only to maintain ustomer relations, "in the hope that the overnment would act to correct the sit- ation, especially since the country is oing through a balance of payment risis". India is losing around $2.5 mil- on on imports of about 1,800 tonnes f EPS, he said.

Numerous factors have rendered ndia an ideal dumping ground for Korean EPS, according to industry ources. The styrene price in Korea is overnment-controlled, giving Korean roducers the benefit of cheaper raw naterial. With a small domestic market nd mandatory export commitment, Korean plants like Shina-a, Lucky and Hanam (average 40,000 tonne capacity) re forced to export at any cost. Taiwan's Kaifu exported EPS at $ 940 tonne last month. Kaifu's price, which is below that of styrene, points to under-invoicing by Indian traders, according to industry observers.

EPS is a speciality plastic. Unlike commodity plastics (including general purpose polystyrene), EPS price has not reacted to the Gulf crisis, and has remained static around $ 1,350-$ 1,400 for the past several months. This is despite the fact that styrene price has shot up from S 800 to S 1,050 a tonne. The current import duty on styrene monomer is Rs. 1,700 plus 35 per cent, which at the current price of $ 1,050 works out to 44 per cent.

On the other hand, the prevailing import duty of Rs. 1,000 plus 45 per cent on EPS works out to an effective 49 per cent on the EPS price of $ 1,350 a tonne. The duty on both raw material and finished product is thus almost the same. This is contradictory to the government's policy of progressively passing import duty from the raw material to the finished product stage to encourage indigenous producers. Accordingly, a reduction in the auxiliary duty of 35 per cent to 20 per cent will bring down styrene prices by Rs. 3 a kg and help Indian companies compete with Koreans, it has been suggested. Thanks to the electronic boom, demands for EPS is growing at more than 15 per cent. A new 2,000-tonne plant of N.M. Nagpal Pvt. Ltd., is going on stream in October. BASF has received permission to expand capacity to 3,576 tonnes at Thane.

Unlike in the case of general purpose polystyrene existing capacity matches the prevailing demand. Producers have urged the government to rectify the anomaly in import duties which will help them as well as the country in preventing unnecessary outgo of foreign exchange.



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AGENTS WANTED IN UNREPRESENTED AREAS.

EXPORT-ORIENTED UNITS

No excise rebate on DTA Sales

The 100 per cent export-oriented units will not be allowed to sell their products in the domestic tariff area (DTA) with excise concession even if these are manufactured entirely out of indigenous raw materials.

The finance ministry has rejected a proposal mooted by the units for restoring the earlier excise notification under which sale in DTA was permitted with an excise duty not exceeding 150 per cent, if goods are manufactured or produced from indigenous raw materials.

The rejection implies that the units will have to pay the full quantum of excise duty as well as customs duty on sale of their products in the DTA. Under the rules governing the 100 per cent EDU scheme, sale of products in the DTA is allowed up 25 per cent of the total production by payment of appropriate duties.

The duties are so high that only a few units have come forward and availed of the facility. Of these three are foreign companies. Supplies of goods and materials from DTA to 100 per cent EOUs, were till recently treated as 'deemed' exports subject to certain conditions. Supplies also included building and construction materials for civil construction work. The objective was to enable the units to receive supplies at reasonable prices.

But this benefit was recently withdrawn, making the operations of the units further uneconomic. Again experience of the working of the scheme shows that 100 per cent EOUs have been at a great disadvantage vis-a-vis those in the DTA in respect of fiscal and other incentives.

While the 100 per cent EOUs enjoy a tax holiday of five years in a block of eight years, there is no such period fixed for those in the DTA. The DTA units are entitled to 100 per cent exemption on their profits under section 80-HHC of the Income Tax Act, but this is not applicable to 100 per cent EOUs.

Also, the 100 per cent EOUs have to balance their exports between rupee payment areas and hard currency areas. There is no such stipulation in the case of DTA units. A minimum value addition on exports is insisted in the case of 100 per cent EOUs while it does not apply to DTA units.

INDUSTRIAL POLICY NOTIFICATION SOON

The much-awaited notification on the industrial policy is likely to come shortly. The only hitch in the way of the notification is whether to have a positive list of items which would be outside bureaucratic controls for the large and medium sector as promised by the industry minister, Mr. Ajit Singh or to have a less cumbersome negative list of industries for which compulsory licensing would be required.

The Prime Minister is likely to take a decision on this shortly, according to official sources. Official experts are however, in favour of the negative list which is a mere 15 pages, thus much smaller than the positive list which is 85 pages.

The base of both these lists is the list of 26 industries which were put in the compulsory licensing list in 1985. According to sources, the list almost remains the same, but for a couple of industries like steel for which the government has already announced some policy changes. On the basis of this, the sources claim that the new policy will not represent any major new liberalisation, but only a consolidation of the liberalisation measures announced since 1985. An exercise done in the industry ministry also reveals that the new industrial policy will increase, rather than reducing the number of cases that will have to take licence.

The industry ministry has also made two more lists. One a list for items exclusively reserved for the small sector. And two, a list of items for which foreign investment would be allowed automatic clearance if the equity participation is 40 per cent or less.

The lists of items likely to be reserved for the small sector are likely to be many times the present number of 826 items. Some sources point that the number of items for reservation of the small sector would be around 3,000. The general principle followed for selecting these items is: all those items which are efficiently produced by the small sector are put under this list.

Presently the small scale sector produces 5000 items. It is likely that items like shampoos, soaps, toothpastes would be reserved for the small sector.

SMOG EFFECT IN EUROPE SEVERE: WHO

A secret report by World Health Organistion (WHO) specialists says thousands of Europeans die prematurely every year because of smog while many more live with chronic illness, DPA reports.

The report, leaked to the environmental group Greenpeace, was compiled for the U.N. Economic Commission for Europe and carries a stamp saying it is not for the media.

It compares pollution levels around Europe and finds that WHO pollution standards are breached in many metropolitan areas, which are hit by elevated readings of corrosive ozone in summer, photo-chemical smog in winter and other pollutants the year round. For the first time WHO Copenhagen office was able to collect data from the whole of eastern Europe as well.

isis threatens Gulf aluminium expansion

uminium prices have soared to the
st levels for 15 months partly on
ack of fears about the impact of
ies of the Gulf crisis. But analysts
est the real threat is that new pri-
aluminium capacity planned for
Gulf will be delayed or cancelled,
ng the Western world short of the
l well into the 1990s.

n the London Metal Exchange
ntly the cash price closed at dollars
9 a tonne, up dollars 60 on the day,
ng climbed by six per cent since.
three months price rose $ 30.50 to
949 a tonne, up four per cent last
k.

emand for aluminium is already
ing ahead of production capacity.
atch up, primary aluminium output
ls to rise from the current annual
l of just over 14 million tonnes to
ut 17 million tonnes by 1994, ana-
s suggest. And, while the Gulf pro-
s only 2.4 per cent of the world's
ent aluminium smelting capacity;
ut 25 per cent by tonnage of all the
or planned smelter projects is
nded to be in the region.

he potential impact of a prolonged
od of instability in the Gulf poses
ous problems for aluminium sup-
s, suggests Mr. Angus MacMillan,
d of research at Billiton-Enthoven
als. Plans are already afoot, at var-
s stages of development, to capita-
on the cheap power available in the
f to increase capacity significantly
r the next few years. Any delays or,
se, cancellations pose supply pro-
ns and further possible tightness in
medium term.

t present there are two large oper-
g aluminium smelters in the Gulf
lba's Bahrain, with the capacity to
duce 225,000 tonnes a year, and
al's in Dubai, with an annual cap-
of 170,000 tonnes.

o far neither seems to have been
affected by the flare-up to any great extent, although shipments of metal to Iraq and Kuwait have been suspended. However, this does not represent a significant proportion of either smelter's production.

There is a third smelter in the region but Mr. MacMillan says that output from Iran's small Arak smelter, with a capacity of about 50,000 tonnes of aluminium a year, is nearly all used inside that country. On the other hand about half the combined output of the Dubai and Bahrain Plants — about 200,000 tonnes a year — is available for export. Expansion of these two smelters is already well advanced. Capacity is being increased to 235,000 by 1994 in Dubai and to 460,000 tonnes in Bahrain.

Earlier this year Iraq signed an agreement with Pechiney, under which the state-owned French group was to have supplied technology similar to that currently being employed in the construction of its own smelter being built at Dunkirk. Construction of the Iraqi smelter at Nassiriyah was due to start in December and the first metal scheduled to be poured towards the end of 1993. Nassiriyah was designed to have an annual capacity of 215,000 tonnes.

Pechiney had informed the Iraqi authorities that it has interrupted the contract in order to comply with the European Community embargo on trade. In typical Gallic style, Pechiney insists the contract has not been cancelled. But obviously the smelter will not be built by 1998 even if there is a quick resolution of the crisis.

Two other smelter projects for the Gulf have been mooted: a 193,000 tonnes a year plant at Doha in Qatar and a 220,000 tonnes project at Yanbu in Saudi Arabia. Mr. MacMillan suggests that these projects have been put on the back burner until the political picture in the Gulf becomes clearer. Assuming a reasonably swift resolution to the Middle East crisis, a return of oil prices to $ 25 a barrel and the continuation of moderate economic growth, aluminium consumption for 1990 should rise by 1.9 per cent to 124.95 million tonnes, suggests Mr. Tony Hayes, metals analyst at James Capel. This level of consumption should absorb the additional metal produced from the start-up of 310,000 tonnes of new capacity scheduled for the second half of the year.

Next year, according to Mr. Hayes, aluminium demand could rise another three per cent to 15.4 million tonnes, which would result in the depletion of producers stocks from the present 3.1 million tonnes to 2.9 million tonnes, so a particularly strong aluminium price could be a prospect for the next 18 months. However, he adds an important cavet. If oil prices rise and remain at a high level for even a few months, consumer spending on housing and durables seems certain to be negatively affected. That would result in a drop in industrial production which would bring aluminium consumption down faster than producers could reduce output — even though rapidly rising energy costs would give them great incentive to shut high cost, marginal capacity.

HALDIA PETROCHEM: TATA TEA TO ISSUE ZERO-INTEREST BONDS

Tata Tea Ltd. will shortly come up with a zero interest-fully convertible debenture issue worth Rs. 110.32 crores exclusively earmarked for participation in the Halida petrochemical project. The hefty public issue would set at rest speculations that the company would take out large funds from Assam, where its tea gardens are situated, and make investment in the mega petrochemical project in the joint sector.

The directors of Tata Tea had categorically stated in the company's annual report that ''not one rupee of the investible surplus generated in Assam will be invested in Haldia''.

PM no to steel price hike

The Prime Minister, Mr. V.P. Singh has rejected the Steel Ministry's proposal for a hike in steel prices.

According to highly-placed sources, in an expected political response to the issue, Mr. Singh turned down the Ministry's proposal about three weeks ago, saying "the time is not right for such a measure."

Swamped with petitions from the two main producers, namely the State-run Steel Authority of India and Tata Iron and Steel Company (TISCO), for a price rise, the Ministry forwarded the proposal to the Prime Minister's Office (PMO) around June.

Mr. Dinesh Goswami, Union Minister, the sources said, favoured a hike in prices because the future of SAIL did not appear bright. By a rough estimate, in the absence of a hike, SAIL, having absorbed the stiff increases in the costs of such inputs like coal and power, might end up with a loss in the region of Rs. 400 crores.

Even though it enjoyed the advantage of captive coal mines, TISCO, too, was reeling under the rising costs.

Since the price hike in June 1989, the prices of inputs had gone up considerably by Rs. 1800 a tonne. The impact of the last Budget by way of power, freight and coal hikes measured up to Rs. 250 crores.

The main producers had petitioned the Ministry saying that the rise in the cost of freight, power and coal had a multiplier effect. And, any revision on the basis of the immediate impact of the Budget would prove inadequate.

They also pointed out that a plethora of State Government taxes were also at work on steel.

Quoting an independent study,
Ministry said the main producers, es
cially SAIL, had already burnt all th
fats absorbing some of the costs
inputs in such areas as infrastructu
wages and stores, and spares.

SAIL had gone on record saying t
it had succeeded in absorbing as mu
as Rs. 900 a tonne through impro
capacity utilisation, better tech
economic norms and greater produ
vity.

Said the souces: "With the fat larg
burnt, it would be difficult for SAIL
continue absorbing inputs price
even if it performs as per plan . Its los
can range between Rs. 400 crores a
Rs. 450 crores."

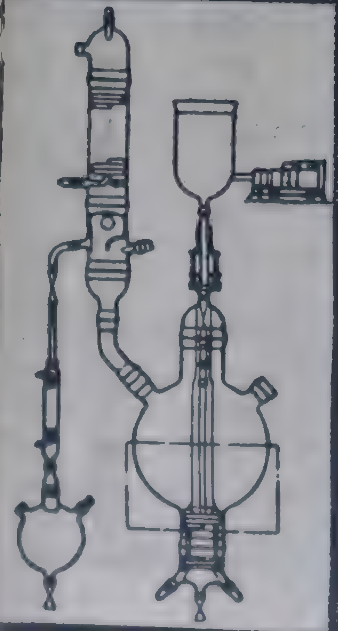
In its petitions, the main produc
had also argued that products like g
vanised sheets, bars and rods which
to customers without adequate purch
ing power would not be allowed a pr
lincrease. In fact, there could be a pr
reduction.

By contrast, the consumers w
could bear or withstand a price r
such as the engineering industry, mi
be persuaded to pay higher prices
their products.

There were two reasons for the h
cost syndrome of the integrated st
plants. First, the high cost of inpu
Second, the higher specific consumpt
of raw materials.

The first factor was due to distorti
that characterise the raw mate
market. And, the second factor w
owing to the quality of raw materi
and inefficient processes.

As it transpired, even though the pr
hike proposal had for now met with
Prime Ministerial rejection, the Mi
try was still open to the idea. SAIL a
TISCO, it is learnt, also had reques
the Ministry to have a second look at
issue.



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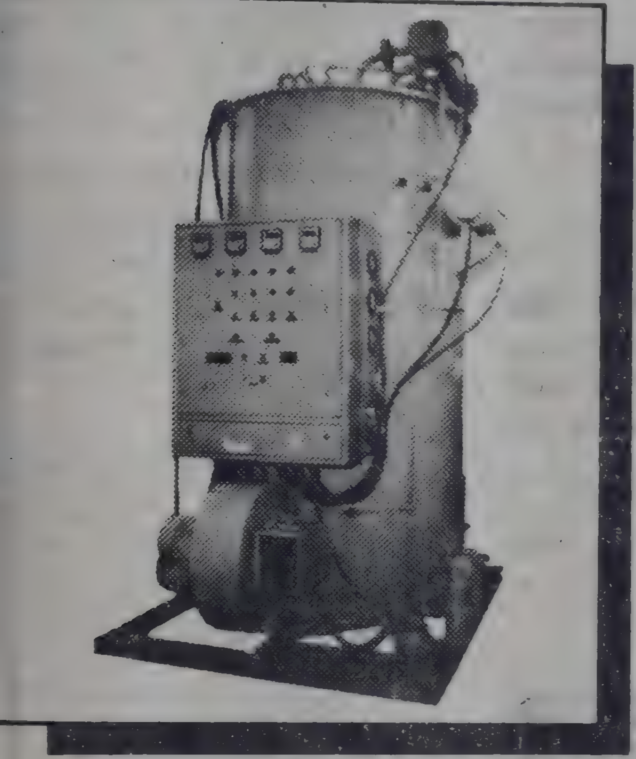

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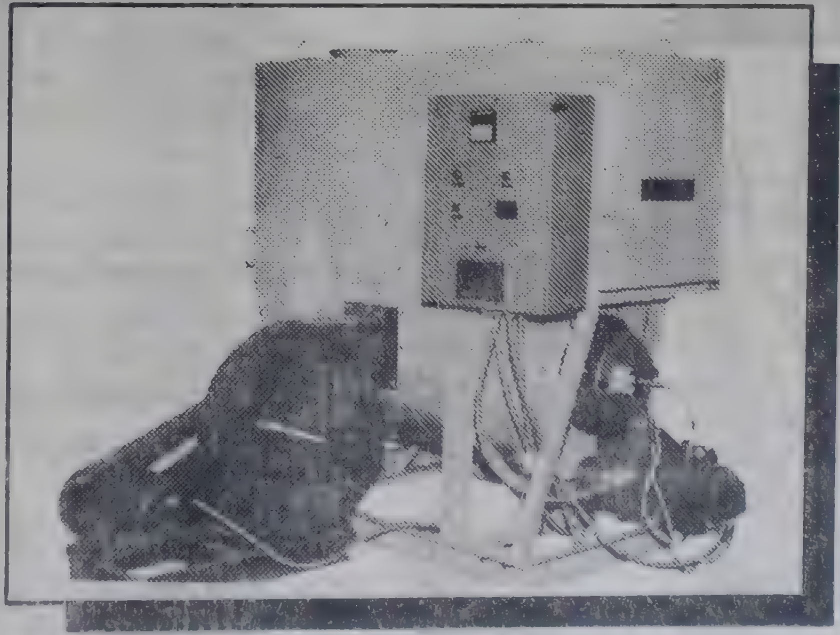

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Synthetics & Chemicals to issue NCDs

Synthetics and Chemicals Ltd., a Kilachand group company, is going to raise Rs. 25 crore soon by issuing non-convertible debentures to part finance the expansion of its styrene butadiene rubber (SBR) plant from the present 40,000 tonnes per annum to 80,000 tonnes and ultimately to 100,000 tonnes.

Synthetics and Chemicals is also setting up a 30-million-litre alcohol distillery for which it has already received a letter of intent. The distillery, being set up at Bareilly, will cost Rs. 11 crore. The company has also received a letter of intent for manufacturing 10,000 tonnes of acetaldehyde which can be manufactured at the existing butadiene plant without incurring any additional expenditure.

For the SBR plant expansion, the company is also raising Rs. 5.75 crore as rupee loans and Rs. 15.39 crore in the form of foreign currency loans in addition to the Rs. 25 crore being mobilised through non-convertible debentures.

Synthetics and Chemicals Ltd., earned a total income of Rs. 141.78 crore during the year ended March 31, 1990, against Rs. 121.61 crore during the previous year ending March 31, 1989. After taking care of all normal expenditure, Rs. 2.57 crore (Rs. 2.41 crore) as interest and Rs. 1.35 crore (Rs. 1.08 crore) as depreciation, profit before tax amounted to Rs. 5.43 crore (Rs. 7.40 crore).

Providing Rs. 1.59 crore (Rs. 1.10 crore) for taxes, Rs. 0.62 crore (Rs.0.67 crore) for investment allowance reserve, Rs. 2.51 crore (nil) as taxation for previous years and bringing forward Rs. 1.71 crore (Rs. 1.49 crore) as surplus from previous years, Rs. 3.90 crore (Rs. 0.04 crore) as provisions no longer required, the net profit amounted to Rs. 6.33 crore (Rs. 7.16 crore).

As on March 31, 1990, the company's equity capital amounted to Rs. 9.85 crore (Rs. 5.81 crore). Of this, 66.83 per cent is held by individuals, 23.71 per cent by financial institutions, banks and insurance companies and the balance 9.46 per cent by corporate bodies. Incidentally, Firestone Tyre and Rubber Co. of US has a 24.74 per cent stake.

Reserves and surplus amounted to Rs. 40.00 crore against Rs. 36.44 crore in the previous years.

FICOM ORGANICS

Ficom Organics proposes to make additional investments of around Rs. 25 crores on new projects in the chemical sector. Further details of the same will be conveyed as soon as the necessary proposals are materialised according to Mr. Rikeen Pradip Dalal, Managing Director.

The company also proposes to widen its product range, so as to cover the entire range of alkyl phenols like para octyl phenol (POP) used in ethoxylate resin manufacture and para tertiary butyl phenol (PTBP) used in specially resin manufacture, with the help of its own Government recognised R & D centre. Intensive efforts are going on to commercialise the same in 1991-92. These being import substitute products, there will be substantial foreign exchange savings. The company also plans to manufacture di-alkyl phenols used in anti-oxidant plastics.

The company has already expanded its capacity for its two already well established products i.e, dodecyl phenol (DDP) and nonyl phenol (NNP) totalling 10,000 tonnes a year, and is further expanding its domestic market as well as searching wider horizon by reaching out to the overseas markets. In view of the prevailing uncertainties in the Gulf, the company is exploring other markets in the other developed and developing countries.

In Mr. Rikeen Pradip Dalal's

the company's thrust, in view of
future corporate growth, would be
maximising productivity, prudent fi
cial management, strategic marke
techniques, human resources deve
ment, further increasing the ma
share.

In line with the Government prio
the company maintained its thrus
exports in 1989-90 which resulte
achieving an export of Rs. 319 la
—showing an increase of about 31
cent. It is laying emphasis to widen
range of exports, keeping in mind a
able plant capacities.

KANORIA CHEM

Kanoria Chemicals and Indust
Limited's chemical works divisio
Ankleshwar in Gujarat has been c
missioned. The unit was set up in t
nical collaboration with Perstorp A
Sweden. It has a capacity to manu
ture 6,000 tonnes per annum of for
dehyde.

Production at the Ankleshwar c
plex during 1989-90 was lower than
of last year because there were prob
in utilising the new membrane tech
ogy which was introduced in the c
try for the first time to m
pentaerithrytol.

However, the group income we
by 40 per cent to Rs. 76.54 cro
1989-90 from Rs. 54 crore in 198
Its gross profit for the year was Rs
crore as compared with Rs. 0.8 cro
the previous year. After providin
depreciation and taxation and t
into account the balance brough
ward from last year, the amount
able for appropriation was Rs.
crore compared with Rs. 1.1 cro
year before.

The directors of the company
recommended a dividend for 1989
the rate of Rs. 1.50 per equity
(subject to tax) on 40,34,400

ICI India to focus on sun-rise industries

ICI India Ltd. will continue to seek opportunities to dispose of under performing assets and to shift resources from businesses which hold small promise to those of greater potential. This was stated by Mr. Jahar Sengupta, chairman, while addressing shareholders at the compay's annual general meeting at Calcutta. Mr. Sengupta, however, declined to specify the assets considered underperforming by the management.

Asked if the sale of the Bombay-based fibre division, which was proving a drag on company's resources, was being considered, the ICI India's chairman replied that several alternatives were being examined in regard to the division so that the financial position of the company improved.

Restructuring of the division was one, leasing of plant and equipment was another. Fuller exploitation of potential for exports was also being considered. "We could have declared dividend at the rate of 15 per cent for 1989-90 only if the fibre division had achieved break-even during the period", he observed. Incidentally, ICI India skipped dividend for 1989-90

Though the chairman did not say in too many words, it was apparent that the management of ICI India would not hesitate to sell the fibre division if suitable opportunities came by. One would not be surprised if negotiations were already on with a few prospective buyers. The sale of the division, it is estimated, will improve the profitability of the company by about Rs. 30 crores.

The sale of the company's office building, Crescent House, in Bombay had been held up as it had not been possible to execute the deed of assignment pending approval of Bombay port authorities, and therefore, the profit from the sale had not been included in the company's results for 1989-90. The sale agreement was entered into for a total consideration of Rs. 27 crores, of which Rs. 18.9 crores had already been received and most of the formalities and approvals complied with. "We cannot wait for an indefinite period and we will take decision in regard to the building soon, latest by March 31, 1991", he observed.

The meeting passed a resolution seeking appointment of Dr. G.Ewart as a director of the company. Dr. Ewart, who was general manager, chemical products, ICI Chemicals and Polymers Ltd., UK, is to take over as the managing director for ICI India Ltd., with effect from September 30, for a term of five years. He will succeed Mr. P.E.H. Daubeney who is returning to ICI, Plc, UK, as regional executive, Africa and eastern region, after spending several years in India.

The sale of ICI, UK's fertiliser business to Finland according to Mr. Daubeney, was unlikely to alter the status of ICI India's fertiliser division. However, as Mr. Sengupta pointed out the sale of fertilisers at a discount in U.P. at the behest of the state government was causing concern, more so when fertiliser companies operating in southern parts of the country were selling their products at a premium. The future of the fertiliser business, he therefore felt, would depend on government policies on retention prices and discounting. The performance of the explosives division had been hamstrung by several factors, first by fire, then by strained industrial relations and currently by frequent interruptions in power supply. "If the power situation continues to be as crippling as this, frankly, we are not sure how long we will be able to carry on", he said.

Referring to the company's performance of the current financial year, the chairman observed that barring unforeseen circumstances, the company was expected to perform better than the previous year. ICI India's participation in downstream projects of Haldia petr chemical complex would depend how soon the state government iden fied suitable projects for the compan

"We approached appropriate autho ities indicating our preferences but t reply is still awaited", Mr. Sengup said. The Government of India approval too was awaited for sever projects which the company propos to take up. These included MM (methyl methacrylate) and related p lymers, dispersions and sheets, late generation synthetic pyrethroid, lam dacyhalothrin within the existi licenced capacity for cypermethrin a expanded range of catalysts at the fe tiliser plant. The scope of the polyu ethane project for which application f letter of intent had been made earli was now being expanded to inclu manufacture of MDI (methane diph nyl di-isocyanate) and a separate app cation for this item had been submitte

In bio-tech areas, oil seeds producti has been identified as a thrust area a test production of high breed seeds h been taken up at the company's Ba galore field station.

NODAL BODY FOR TRANSFEI OF RESEARCH FINDINGS

The Centre has formed a nodal bo for transferring research findings national laboratories, especially in t field of aromatic and medicinal pla and essential oil chemistry, to farme cultivating these plants.

Giving a special address at the on day seminar on scope of aromatic pla and processing industries in Madurai Sept. 9th, Dr. Vincent Paul, Chairma Essential Oil Association of India, sa the committee's aim was to increa cultivation area and yield of medici and aromatic plants by five percent. I said a task force had been set up for t purpose and demonstrations would held by scientists and bio-technologis in front of potential growers.

Indian Dyestuff Industries

Indian Dyestuff Industries (IDI) pro-
ses to set up a 100 per cent export-
iented unit for the production of
pper phthalocyanine crude (CPC) in
llaboration with Enimont group of
ly. For that purpose, a new company
ll be formed wherein IDI's partici-
tion will be to the extent of 35 per
nt of the capital and 65 per cent will
held by Enimont group.

The plant will be situated at Ranoli,
aroda. The project work is expected
start in the last quarter of 1990. The
ant will have an initial capacity of
00 tonnes and will be increased to
00 tonnes in the course of three to
ur years. The company expects to
mmission the plant by the end of
92.

The main raw material for the man-
acture of CPC is phthalic anhydride
ich is available from the Baroda unit.
is will help the company to have better utilisation of capacity.

IDI has been granted a letter of intent for manufacture of 800 tonnes per annum of agrochemicals, namely, monocrotophos and phosphamidon of its Boisar plant. The raw materials for the manufacture of these agrochemicals, viz. alkylamides, are presently manufactured at the Boisar plant.

The implementation of the project will take about three years and the total cost of the project is estimated at Rs. 7.25 crores, which will be financed out of the internal accruals and borrowings from financial institutions.

ABBOTT LABS

Abbott Laboratories (India) has reported improved margins and profits during the first five months of the current year as compared to last year. Mr. R.A. Shah, chairman, told shareholders at the annual meeting that some of the company's products which were previously out of price control purivew have been brought within it and this had an adverse impact on the profitability of the company.'

The meeting which was held at the Indian Merchants' Chamber had a heavy police bandobust due to a demonstration by company workers owing allegiance to the Abbott Laboratories Employees' Union. The company reported a profit of Rs. 35.89 lakhs before depreciation for the year ended March 1990. According to the general secretary of the workers union the demonstration was held against the "unfair labour practices" indulged in by the management.

RAJ PRAKASH CHEMICALS

Sales of Raj Prakash Chemicals during the first five months of the current year at Rs. 227 lakhs are keeping pace with last year's level of Rs. 230 lakhs, for the same period an all out effort to improve performance was on, and 1990-91 should be better than last year, according to Mr. Vasantal L. Patel, Chairman.

Addressing shareholders at the annual general meeting, he said that regarding the expansion project, all the utilities and certain section of the process plant had already been commissioned. The sanction for balance term loan of Rs. 120 lakhs had been received from IFCI for the revised scheme, paving the way for its timely completion. The expansion project was fully implemented within about six months, he added.

PEARL POLYMERS

Pearl Polymers had maintained the dividend at 20 per cent pro-rata for the year ended March, 1990. The turnover is up to Rs. 15.93 crores from Rs. 13.64 crores and the gross profit jumped to Rs. 143.88 lakhs from Rs. 144.55 lakhs

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What the World Thinks of India

In the course of my consulting activity worldwide, I solicit, encourage and even arrange for foreign investments in India. Despite liberalisation in recent years and a very healthy trend in economic growth, India does not rate very high in investment league. Besides, let us be honest, image of India abroad is not very good — largely due to total ignorance and lack of knowledge about our country. This was driven home to me by a letter just received from Germany, excerpts as follows:

> As a German who lived for many years in India (my wife is Indian) and who really likes India, may I offer you some friendly advice?.... (Your) biggest problem is the bad image of India....The TV and Newspaper image is very negative....... When the Sati of Roop Kanwar took place, the newspaper and TV coverage was very extensive and many Germans had the impression that all Indians burn their wives.....Therefore I feel that the main aim of you business people should be to polish the image of India abroad....Your ministries are not willing and able to counteract (this) as they are very corrupt so I feel that you private people should organise.....to fight this insulting reporting....If you do not fight for your rights, no one will...
>
> ....You Indians are very weak at asserting yourselves. In Europe, Indians are beaten up....by all types of scum whereas Chinese, Vietnamese, Koreans or others from the Far East are respected....they fight back....Even in Africa, (Indians) are beaten up whereas Chinese and others are hardly touched. You people are very submissive....you all must be more pushy....if you are ever to gain respect....no one will respect you if you are weak....
>
> Thirdly....your quality of goods is really bad. You have the technical personnel....but....how do you expect to export goods.....others in Asia are not exactly sleeping....
>
> Lastly but not least, (your) bureaucracy will never allow the country to progress unless you....force them to reform as the government has no real political will....If you business people organise some type of clean government....a lot of citizens will join you like in Eastern Europe....Otherwise you will not become a major economy even in 200 years....Indians must struggle....and all the aid in the world will not help you....The Western countries prefer to have a poor and weak India.

Your valued readers would appreciate that I have quoted at length from the letter to convey the perception of India abroad as seen through the eyes and ears of our well meaning German friend. There is much truth in what my correspondent says. Though unsolicited, I highly value his judgement since it speaks for this good of 'the native land of my wife'. I do hope that the message is driven home at the right quarters: - New Delhi; Our embassies and consulates everywhere; Indians abroad; and last but not the least Indian business. The correspondent means well and I wish we all take it to heart and ACT, NOW!

Dr. Kharbanda, a Fellow of the Institution of Chemical Engineers, is a visiting professor and author of repute. His recent title: TAKEOVERS, MERGERS & ACQUISITIONS (Kogan Page, 1988). Forthcoming titles: (All with Mr. E.A. Stallworthy) WASTE MANAGEMENT — TOWARDS A SUSTAINABLE SOCIETY (Gower, 1989) & PROJECT TEAMS — THE HUMAN ELEMENT (Ntl. Computing Centre, 1990). Available from Vivek Enterprises, 5 S.K. Barodawalla Marg, Bombay 400 026.

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Food & Pharmaceutical Technology in Perspective

ILY FISH & HEART DISEASE

The observation that fish eating eople (such as Eskimos and the Japnese) are relatively immune from schaemic heart disease (IHD) has rompted a series of studies which sugest that oily fish is the protective agent. he effect is probably mediated in part t least, by a reduction in the tendency f blood to clot.

Biochemical investigation of the skimos and Japanese diets have ocused attention on certain polyunsatrated fatty acids which are abundant in nly fish and certain other seafoods. hief among these fatty acids are eicospentaenoic acid (EPA) and dicozahexenoic acid (DHA), both of which are resent in relatively high concentrations the plasma of people who eat large uantities of fatty fish.

Therefore, it may concluded from tensive research that oily fish has the llowing effects in relation to IHD.

It improves survival in men who have recently recovered from myocardial infraction (MI).
It reduce the plasma or serum triglyceride concentration
It reduces the tendency of blood to clot
It reduces blood pressure slightly and
In some animals it prevents the progression of atheromatous plaques and reduces the incidence of ischaemic arrythmias.(*The Practioner* 4/22/90, p. 401).

MV IMMUNO GLOBULIN FOR RANSPLANT PATIENTS PPROVED BY FDA IN USA

A new immuno globulin has been ensed to help protect transplant tients from the severe, potentially fatal effects of cytomegalovirus (CMV) infections, which can be carried by donated kidneys.

Cytomegalovirus Immune Globulin Intravenous (Human), or CMV-IGIV, licensed by FDA last April, is designed for kidney transplant patients who show no signs of CMV infection before surgery, but who are receiving kidneys from CMV positive donors. Most adults in USA have been exposed to CMV, a common and usually harmless virus. However, when the virus is transmitted to an immune-suppressed transplant receipent, the patient is often unable to fight off the spread of infection to the eyes and to critical organs, such as lungs and liver. (The immune systems of transplant recipients are suppressed by drugs to keep them for rejecting the foreign organ).

CMV can impair and in some cases eventually destroy, the infected organs, sometimes leading to death.

CMV-IGIV is derived from human plasma that contains high concentrations of cytomegalo virus antibodies. Given to uninfected patients shortly before and for some time after the transplant, it can reduce the severity of infection. People infected with CMV before their transplant surgery do not need CMV-IGIV because they already have protective antibodies.

Patients who received CMV-IGIV in clinical trials suffered no major side effects, although a small number of patients had one or more of the minor side-effects of flushing, chills, muscle cramps, back pain, fever, nausea, vomiting and wheezing.

Physicians are being instructed not to give CMV-IGIV to patients who are hypersensitive to immunoglobulin-A. CMV-IGIV was developed under FDA's Organ Products Development Programme. (*FDA Consumer* July/August, 1990, p. 3).

BRITAIN IN THE VANGUARD IN CHIRAL SYNTHESIS OF DRUGS & CHEMICALS

British researchers are in the vanguard in chiral synthesis of drugs and chemicals. Therefore the Uk government has decided to support a £7 million ($ 12 million) collaborative research programme into assymmetric synthesis. As part of the LINK initiative, it is giving £3.5 million over a 5 years period, with funds coming from both the Science & Engineering Research Council and the Dept of Trade & Industry. These will be matched by contributions from industry, towards individual products.

Asymmetric synthesis allows the production of pure chemicals free from enantromeric forms. As such chemicals with distinct properties can be produced, giving better performance and freedom from potential side effects in drugs.

This asymmetric synthesis gives hope for new drugs and therapies in the pharmaceuticals sector.

Already 47 industrial and 13 science based organizations have shown interest in the programme, which is focusing on five main areas of research:

1. New drugs, reagents and catalysts.
2. Fundamental understanding of key reactions.
3. Routes to asymmetric asymmetric C-C bond formation
4. Asymmetric oxidation and reduction reactions and
5. enabling technology for larger scale synthesis of drugs and chemicals

Bot Malpas, chariman of the LINK steering group, comments: 'There are opportunities here for many small firms in the fine chemicals sector — and there is scope for highly innovative products in this area of considerable technical risks'.(*ECN*, 7/2/90, p.32).

NEW CHEMICAL ENTITIES —NCE LAUNCHED IN 1989

In the past year 1989, 35 new chemical entities (NCE) have been introduced in the market. 'For the 35 NCEs refer Scrip Reivew Issue 1989, pp 14-15.'

Japan was again as throughout the 1980s, the country in which the greatest number of NCEs were introduced, with 12, followed by UK and USA with four each.

France with three, W. Germany, Holland and Ireland with two each, and one each in Argentina, Austria, Denmark, Finland, New Zealand and Sweden.

The most popular therapeutic category was cardio vascular with 12, followed by neurologicals 9, anti cancers 3, gynaecologicals 3, anti-infectives 2, and dermatologicals 2.

The breakthrough products among NECs in 1989 with their order of importance are as under:

Cetus r-DNA interleukin-2 (Proleukin) and Biogen's gamma-interferon. they are both novel forms of therapy, which were previously unavailable.

Interleukin-2 also has the potential to treat a previously untreated disorder, renal cell carcinoma.

Other significant NCEs included Merrell Dow's enoximone, the first cardio stimulant which inhibits phosphodiesterase activity and the world's first aldose reductase inhibitor, Wyeth-Ayersl's tolrestat for diabetic neuropathy.

Other noteworthy NCEs include (a) Astra's forscarnet sodium for CMV retinitie, (b) the first once daily quinolone antibacterial lomefloxacin (c) Roussel Uclaf's abortifacient mifepristone and (d) Merrell's anti-epileptic, Vigabatrin. (*Scrip Review Issue* 1989, pp. 14-15).

A NEW PROCESS REMOVES CHOLESTEROL FROM FATS

The Omega Source Corporation of Burnville, Minnesota, USA is commercializing a process for removing cholesterol from animal fats or oils. It plans to have an intermediate scale plant in operation in mid-1990.

The oil or fat is deaerated under a vacuum and mixed with steam.

The mixture is then fed into a flash chamber where it is flash vaporized, and the oil is then cascaded down an alternating series of jackets and disks heated against a steam counter current to vaporize the cholesterol rich fractions.

The process takes less than 5 mins, removes 90-94% of cholesterol from the fat or oil and results in yields greater than 95% the firm reports.

The company estimates that the process will add at most 10 cents a pound in operating costs.

In many cases it will cost less, depending on the type of oil fat being processed and the scale of operation. For most products there will be no impact on the flavour.

Omega source has been operating a pilot plant since November 1988 and is in the process of constructing an intermediate sized plant. They will turn out 300 lbs of treated product per hour.

The company is licensing the technology to food companies.

It expects to see industrial scale usage by the end of 1990. Most food proce
sors would find the equipment fair
easy to implement into their system
Both dairy and fish oil industries ha
shown interest in the new technolog

It is reported that the company
working closely with processors
develop no cholesterol fish oil mayo
naise, peanut butter, canned fish, surir
prototype and salad dressing. (*Infor*
4/1990, pp. 366-68).

SOY PROTEIN FOODS GROSS 800 MILLION IN USA

Soyfood sales is progressive
increasing in USA and provide a lion
share of protein in the human diet.

Soyfood sales in USA grossed near
$ 800 million during 1989 — $ 150 m
lion more than during 1988 — and a
projected to reach $ 1 billion by 199
according to Soyfoods Association
America.

The Association which has desi
nated April 1990 as 'Soyfoods Mont
expects soyfood sales to increase
consumers consider health concerns
purchasing foods.

'As Americans turn from a me
based to a plant-based diet, soyfoo
will continue to increase in popularit
according to Ginny Messina, a reg
tered dietician, who is a consultant
the Soyfood Association of Americ

The biggest selling soyfoods in US
are soy sauce, tofu and soymilk (t
latter excludes infant formulas ma
with isolated soy proteins).

Tempeh, miso, soynuts and su
second generation products as di
dressings, 'cheese', non-dairy desse
and imitation meat and dairy produ
made from soy foods such as tofu
other commonly known foods ma
from soybeans. (*Inform* 4/19
pp.374-76).

RLD'S TOP-TEN SOYBEAN IMPORTERS

oyabean oil is important in edible oil e worldwide. World's top ten soyan oil importers in 1989-90 and their uai imports have been reported in World publication.

Top-ten Soyabean Oil Importers Worldwide

untries	1989-90	1985-86
	(1,000 metric tons)	
C-12	572	499
ina	450	110
kistan	399	376
n	450	250
ngladesh	260	69
SR	200	68
lia	165	251
stern Europe	149	137
rkey	140	96
orocco	120	78
orld Total	4389	3080

ource: Oil World published by ISTA ielke PO Box 900803, 2100 Hamburg)(West Germany)

EAST COATINGS PRESERVE RUITS & VEGETABLES

Researchers at Israel's Agricultural esearch Organisation (ARO) near Tel viv have isolated a form of natural ast that occurs in nature on the skin citrus fruit protecting against fungi. is natural yeast has been already proced in large quantities, patented and ccessfully applied to a consignment tomatoes and cucumbers exported to rope.

Israeli experiments show that 95% of e produce stays fresh after treatment ith this yeast, reports Dr. Edo Chalutz the ARO Institute for Technology & orage of Agricultural Products. This east does not affect taste as it occurs large quantities in certain cheeses. Dr. helutz envisages a situation in the near future, whereby a dipping coating process is built into all fruit and vegetable packing stations. Israel also hopes to export laboratory made yeast to farmers in Asia, Africa and America who export their fresh winter produce to Europe. India should cooperate in agriculture with Israel, particularly in arid zone agriculture. The application of the above yeast in India can save several lakh tons of vegetable and fruits from deterioration in our country. (*Food Digest Jan-March* 1990, p. 3).

OIL SUBSTITUTION IN FOOD FORMULATIONS

Food formulators and housewives considering new sources of fats and oils for food products need to consider nutritional aspects with reference to the percentage of monounsaturated, polyunsaturated and saturated fatty acids. The following table gives typical fatty acid percentage of primary vegatables oil.

EDIBLE OIL FROM THE FUNGI FUSARIUM PALLIDOROSSUM

Researchers at the Defence Food Research Laboratory (DFRL) have identified a species of fungi Fusarium Palaidorosuum as potential future source of edible oil. Under optimum conditions, the oil yield from the above fungi is nearly 38%, which compares very well with the oil output from various oil producing seeds.

The edible oil available from groundnut is about 45%, while the oil palm, the coconut and the soya bean each have yields less than 20% of the seed mass. The oil obtained resembles olive oil in its chemical composition.

The commercialization of this new source of edible oil can enable the country to narrow the scarcity of edible oil in the country in future. (*Food Digest Jan-March* 1990, p. 4).

A MODERN SNACK-FOOD PROJECT ESTABLISHED WITH FOREIGN COLLABORATION

A modern snack food plant Reliable Foods has been recently set up at Mandeep with technical collaboration with Western Japanese company. The company has launched its products in India. It has also started exporting the products to the Middle East Countries. It expects a turnover of Rs. 5 crores

Typical fatty acid content of primary vegetable oils

Oil	%Mono Unsaturated	%Poly Unsaturated	% Saturated
Canola	60	34	6
Cocoa butter	35	3	62
Coconut	6	2	92
Corn	27	57	16
Cottonseed	19	55	26
Olive	72	11	17
Palm	40	10	50
Palm-kernel	14	2	84
Peanut	46	35	19
Safflower	13	77	10
Safflower(high oleic)	80	12	8
Soybean	24	60	16
Sunflower	18	70	12
Sunflower (high-oleic)	80	12	8

(*Inform* 4/1990 p.388)

crores per annum. (*Industrial Products Finder* 18 (4), 1990, 129)

MANGO AND GUAVA MONOGRAPHS PUBLISHED BY CFTRI

The Central Food Technological Research Institute (CFTRI), Mysore has recently published two very useful monographs:

(1) Mango in India (61 pages) and
(2) Guava in India (36 pages).

These monographs deal with production, preservation and processing aspects covering distribution, varieties, propagation, harvesting, packaging and transportation. Other aspects covered are physico-chemical changes during development, pests and diseases, handling and storage, chemical composition etc. A comprehensive list of literature reference and information on specifications for various products made from these fruits adds to the usefulness of these publications. Mango in India has additional information on model schemes for processing, exporters of mangoes and suppliers of processing equipment and machinery. The price of Mango Monograph is Rs. 50 and that of Guava Monograph Rs. 30. Postage extra. Other monographs available in the series are:

1. Pineapple (Rs. 15)
2. Pepper (Rs. 15)
3. Papaya (Rs. 20)
4. Grapes (Rs. 20)
5. Bananas (Rs. 30)
6. Mandarin orange (Rs. 30)

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CFTRI DEVELOPS LOW LACTOSE BABY FOOD FOR INFANTS & CHILDREN

The CFTRI (Mysore), has developed a baby food formulation for infant and children suffering from primary lactose intolerance and lactose induced diarrhoes. The new low lactose milk-based baby food has been developed by CFTRI researchers by enzyme processing of milk. The standardised baby food formula has proved successful in controlling diarrhoea due to transcent lactose intolerance in large scale clinical trials. Being a milk-based formulation, the new baby food is highly acceptable to infants. It does not contain soya as is prevalent in commercially available products. The process can be adopted in existing dairies with facilities for spray drying. The machinery and equipment are easily available indigenously.

MICROWAVE FOODS OPEN A NEW PACKAGING MARKET

The extensive use of microwave on American homes has spawned a new heat enhancing packaging market in USA. Sales of heat enhancing packaging for microwave foods will reach nearly $ 490 million by 1994 according to recent study by Kline & Co., Fairfield, N.J. Microwave enhancers are added to packaging to overcome common problems of microwave cooking, soggy crusts, lack of browning and uneven heating. Kline report places the current market at 2 billion enhancers worth $ 166 million and expects it to grow 24% annually and reach 4.6 billion enhancers by 1994. There are three types of microwave enhancers — susceptors, field modifiers and shields —but the susceptors made of aluminium metallized PET film laminated in paper and paperboard presently dominate the market. These are effective for most foods but are insufficient for moist ones.

Researchers are trying to develop ideal susceptors that heat quickly to designated temperatures and maintain such temperatures throughout cooking but Kline reports these technologies will be more expensive and find use only for foods that can bear higher packaging costs. The present FDA investigation on safety has halted the market growth of microwave heating enhancers. The industry anticipates positive results from the FDA investigation. Once the FDA completes its assessment, new product development in microwave enhancers will begin afresh. (*CMR* 4/9/90, p. 20)

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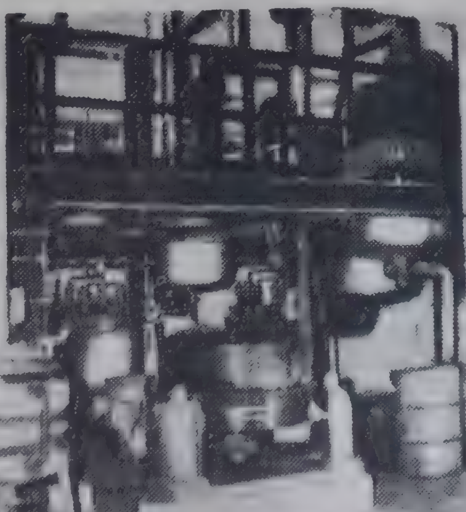

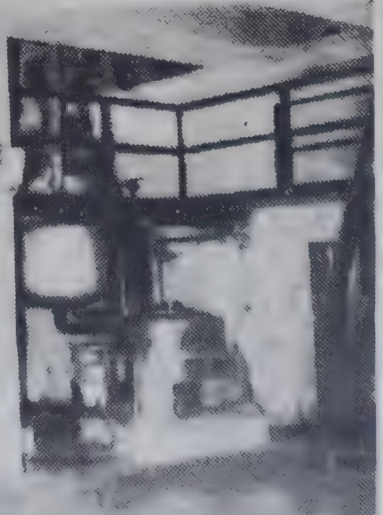

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International scenario for export of dyestuffs and their intermediates*

J.B. PATEL
Senior Faculty, EDI-I, Ahmedabad

ckground

e Dyestuff industry constitutes a major branch of chem- l industry consisting of various types of dyes and dye ermediates. Dyes have applications in textile, paper, print- g ink, leather, paint and food industries. The textile indus- is the major consumer of dyestuffs. The manufacture of es began in 1951 in India with imported dye intermedi- es by some large units. After 1965, the manufacture of ermediates was started and in these 20 to 25 years the pendence on imports has considerably reduced to less than % at present. Today, the wheel has turned full circle and dia exports dyestuffs to the very same countries on which was dependent till recently for dyes as well as for inter- ediates. The industry has emerged as an important net for- gn exchange earner and has been identified as a thrust area r increasing exports.

After 1952, a few large units were set up mainly as import bstitute units. Some of the top world leaders linked with dian partners such as ICI of U.K., Montecatini of Italy and ayer and Hoechst of West Germany. This gave an initial oost to Indian dyestuffs industry. Now, within the chem- al industry the fastest growing sector at present is that of yestuffs and dye intermediates, export of which practically ossed 25% of the overall chemical industry's exports of s. 822 crores last year. It is interesting to note that dye- uffs and dye intermediates covered by Panel-II of CHEM- XCIL have been struggling for more than a decade to chieve the export target of meagre Rs. 50 crores annually. or the first time in 1986-87, it nearly touched Rs. 100 crores, mped to Rs. 215 crores in the subsequent year and recently rawn up plans aimed to reach Rs. 900 crores during the year 991.

ndia's capability to meet challenges

Without assessing our capacity to produce and looking at ne problems, we cannot put the realistic targets for export f dyes and their intermediates. It is, therefore, logical to eview our capability to meet the challenge before us.

From seven manufacturers in the 50s, today there are 37 nanufacturers operating in the organised sector and at least 900 in the small scale sector, manufacturing practically all types of pigments and dyestuffs in the country. A large number of dyes intermediates are produced indigenously, and exported to developed countries. For example, intermediates like H-acid, tobias acid, Chicago acid, peri acid, chrome dye intermediates and beta-naphthol are produced in small as well as organised sectors.

Production of dyestuffs in the organised sector reached a peak of 20,244 MT in 1979-80 but declined somewhat with just 19,007 MT in 1986-87 as against 10,025 MT in the small scale sector in the same year. The present production of various types of dyestuffs by the small and organised sector is of the order of about 29,000 MT. The installed capacity and production are shown in Tables 1 and 2 respectively. This indicates that the present installed capacity is about 35,000 MT and capacity utilisation is only 65%. Therefore, organised sector can be geared to utilise their capacity fully and help in achieving export targets.

The country is absolutely self-sufficient in dyestuffs with a total installed capacity of about 35,000 MT in the organised sector, comprising a wide range of products such as direct, acid, basic, sulphur, reactives, vats, disperse, metal complex, naphthols, bases, pigments, etc. for the ultimate consumption in cotton textiles, polyester, wool, leather, nylon, silk, paints, printing inks, plastics, rubber etc. Capacity utilisation is over 100% in the case of organic pigments and reactive dyes.

As against the above capacity for dyestuffs, the estimated domestic demand for various classes of dyestuffs is shown in Table 3 for the years 1989-90; 1994-95 and 1999-2000. This clearly indicates that India will have to create additional capacity to meet the growing demand within the country as also to meet the demand for exports. It has been indicated that given necessary support and adequate supply of raw materials, it is possible to push up dyestuff exports to nearly Rs. 1,000 crores in the next two to three years. For 1990-91, the dyestuffs export target is reported at Rs. 900 crores. However, it will be necessary to modernise the dyestuffs industry particularly to fill the technology gap in certain areas like filteration, drying, material handling and pollution control.

The dyestuffs and organic pigments produced currently in India meets nearly 95% of the domestic need from hue/fast-

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Paper presented at the International Seminar on Chemicals & Pharmaceuticals held at Hyderabad in July 1990.

Table - 1

GROUPWISE DYESTUFF PRODUCTION IN THE ORGANISED AND SMALL-SCALE SECTOR FOR 1986-87

(Tonnes)

Dyestuff Group	Production in the organised sector	Production in the small-scale sector	Total Production
Acrylic fibre dyes	6	5	11
Azo, acid & direct dyes	2478	2250	4728
Basic dyes	73	700	773
Disperse dyes	1977	--	1977
Fast colour bases	535	750	1285
Food dyes	46	50	96
Ingrain dyes	137	--	137
Naphthols	922	800	1722
Oil & Spirit soluble dyes	56	180	236
Optical brighteners	909	1500	2409
Organic pigments (including pigment emulsion)	5901	450	6351
Reactive dyes	2542	3000	5542
Solubilised vat dyes	150	--	150
Stabilised vat dyes	26	600	626
Sulphur dyes	1500	--	1500
Vat dyes (including indigoids)	1749	--	1749
Total	19007	10285	29292

ness point of view. However, gaps certainly exist in newer and more economic dyestuffs of the same or of similar hue/fastness and the newer products designed for economy, ease of application, higher fixation efficiency, fastness properties, and superior colour yields.

World Scenario

In order to examine the future prospects of country's exports it is necessary to quickly review the present scenario of the dyestuffs manufacturers all over the world. In the recent past, it is observed that seven major American Companies left the field of dyestuffs manufacture. These major players who were Allied Corporation, Tenneco, Harshaw, American Cynamide, Otto B May, Buffallow and Du Pont stopped making dyes and sold segments to different firms.

The share-out in the synthetic dyestuffs industry has left dominant European manufacturers such as Crompton Knowles, American Colour and Atlantic Chemicals, which presently operate in the $800 million dye market in the U.S.A. The share of world dyestuff/organic pigments production by different countries is shown in Table 4. While the European manufacurers still dominate the world markets, it appears that there is a lot of rationalisation of production, consequently creating a vacuum for certain group of dyestuffs. After the disastrous conditions in 1980s, some twenty medium size companies have virtually shut down. The total EEC consumption of organic colorants moved up from 1,55,500 MT in 1986 valued at US $1.62 billion in 1987. The recent survey

Table - 2

UTILISATION OF CAPACITY FOR DYESTUFFS IN THE ORGANISED SECTOR -- 1979-80, 1984-85 & 1986-87

Dyestuff Group	1979-80			1984-85			1986-87		
	Installed capacity	Production	Capacity utilisation (%)	Installed capacity	Production	Capacity utilisation (%)	Installed capacity	Production	Capacity utilisation (%)
Acrylic fibre dyes	475	10	2.1	475	--	--	725	6	0.8
Azo, acid and direct dyes	4174	3410	81.7	4174	2399	57.5	4174	2478	59.4
Basic dyes	1135	946	83.3	1135	51	4.5	1135	73	6.4
Disperse dyes	1782	895	50.2	2323	1486	64.0	2016	1977	98.1
Fast colour bases	1709	1134	66.4	1709	716	41.90	1709	535	31.3
Food dyes	529	65	12.3	529	44	8.3	570	46	8.0
Ingrain dyes	315	215	68.3	315	166	52.7	752	137	18.2
Naphthols	1615	1748	108.2	1615	1165	72.1	1615	922	57.1
Oil & Spirit soluble dyes	176	38	21.6	176	29	16.5	176	56	31.8
Optical brighteners	1304	1105	84.70	1454	635	43.7	1958	909	46.4
Organic pigment (including pigment emulsion)	6264	5352	85.4	7407	6159	83.2	9348	5901	63.1
Reactive dyes	2097	1982	93.6	2877	2110	73.3	5702	2542	44.6
Solubilised vat dyes	370	103	27.8	370	52	14.1	370	150	40.5
Stabilised azoics	685	85	12.4	685	52	7.6	685	26	3.8
Sulphur dyes	2610	1545	59.2	2610	1584	60.7	2610	1500	57.5
Vat dyes (including indigoids)	1761	1631	92.6	2174	1764	81.1	2664	1749	65.7
Total	27001	20244	75.0	30025	18412	61.3	36709	19007	51.8

Table - 3
ESTIMATED DOMESTIC DEMAND FOR VARIOUS CLASSES OF DYESTUFFS 1989-90, 1994-95 & 1999-2000

lass of dyes	1989-90 (tpa)	1994-95 (tpa)	1999-2000 (tpa)	Compound Growth rate (% per year)	
				1989-90 to 1994-95	1994-95 to 1999-2000
crylic fibre dyes	335	540	800	10.2	8.0
zo, acid & direct dyes	8480	9350	10000	2.0	1.5
asic dyes	1700	1925	2100	2.5	2.0
isperse dyes	5375	8675	12750	10.0	8.0
ast colour bases	2770	3150	3500	2.5	2.2
ood dyes	120	120	120	--	--
ngrain dyes	335	370	400	2.0	2.0
aphthols	2650	4150	4600	2.5	2.2
il & Spirit soluble dyes	300	400	500	5.0	5.0
ptical brighteners	2570	3280	4100	5.0	4.5
rganic pigments (including pigment emulsion)	4425	5650	7200	5.0	5.0
eactive dyes	4650	5650	6850	4.0	4.0
olubilised vat dyes	150	170	190	2.5	2.5
tabilised azoics	200	200	200	--	--
ulphur dyes	3325	4450	5650	6.0	5.0
at dyes (including indigoids)	1680	1900	2150	2.5	2.5
Total	40065	49980	61100	4.5	4.0

Table - 4
SHARE OF WORLD DYESTUFF/ORGANIC PIGMENTS PRODUCTION

Country	% Share in World Production
West Germany	22.4
U.S.A.	18.0
U.S.S.R.	12.9
Japan	9.3
Switzerland	8.3
U.K.	8.2
France	4.8
India	3.6
Others	12.5

forecasts that total consumption will jump to 1,67,300 MT by 1990-91 valued at over US $1.74 billion. In the dyestuffs sector, 73% of the total market by tonnage and 62% by value are fibre reactive dyes which currently play a prominent role.

In 1976 there were 21 large scale dyestuff manufacturers in USA. Now the number has shrunk to 10. In all there is 40% reduction in the quantity of dyestuffs produced by U.S.A. This is mainly due to strict pollution control measures adapted by the Government to curb air and water pollution. However, the consumption in textile sector of U.S.A. has not reduced and therefore to bridge the gap the country has started importing large quantities of dyestuffs and intermediates.

The current world production of dyestuffs and organic pigments are of the order of 650,000 MTA and 150,000 MTA respectively. India produces only 29,000 MTA out of the total 800,000 MTA world production. Thus, our share is only about 3.6%. Country-wise share of world production of dyestuff and intermediates is given in Table 4.

Fortunately for India, there is an installed capacity of 14,000 MT per annum for reactive dyes between the two sectors and capacity utilisation is hardly 45%. The overall sales in the EEC markets at present ranges between US $1.0 billion to US $1.05 billion, which is a huge market by any standard.

There was an aggregate growth of 17% in global production of all fibres/filaments in the six-year period, 1980-86. The share of cotton in the world production has improved from 48% to 50% at the expense of cellulosics, which have dropped from 11% to 9%. The share of synthetics has remained steady at 36% and that of wool at 5%.

Country-wise analysis of exports

Some of the international developments proved conducive to the growth of export market for Indian dyestuffs. Due to the campaigns by the local authorities against pollution, several European countries and America introduced strict anti-pollution measures. These pushed up the cost of production of dyestuffs in these major markets. Gradually, these countries started curtailing their domestic production and instead imported their requirements from countries like India.

India exports dyes to more than 30 countries including the developed and the developing countries. The countries where Indian dyes are exported include developed countries like USSR, USA, UK, Netherlands, Japan, Germany and developing countries like Bangladesh, Sri Lanka, Pakistan, etc. Most of the market for Indian dyes is in the developed countries. Let us look at individual countries for export potentiality.

Table - 5
WORLD MARKET SHARE OF MAJOR DYE CLASSES

Cellulose fibres	%	All Fibres	%
Sulphur dyes	29.0	Sulphur dyes	18.0
Direct dyes	27.4	Direct dyes	17.0
Vat dyes	19.4	Disperse dyes	16.5
Reactive dyes	9.7	Acid dyes	16.5
Azoic dyes	8.1	Vat dyes	12.0
Pigments	6.4	Azoic dyes	6.0
		Basic dyes	4.5
		Pigments	4.0

West Germany

West Germany is the world's largest exporter claiming 34% share in world exports. However, during the last 3 years, it has also phased out production and therefore has started importing dyes from India. We have about 2% share in imports by West Germany in dyestuffs. The dyes having good market in this country are solvent dyes and organic pigments. The colours demanded are mostly violet, blue and green. The present market is of the order of US $340 million which is likely to go upto US $360 million by 1991.

United States of America

U.S.A. is quite an old market for Indian exporters. The export to this country has steadily increased in the recent past and India's share is now about 4% in US imports of dyes. The vat dyes occupy a very prominent place in export of dyestuffs to USA. The export of reactive dyes has also increased in the current year. The colours mostly imported from India are blue, yellow, violet, black and green.

U.S.S.R.

U.S.S.R. is one of the big markets for export of dyestuffs from India. The trade ties between USSR and India are deep rooted. It is a country with a population of about 300 million people. The main dyestuffs to this country are acid, vat, direct, sulphur and azoic. Inspite of increase in our exports to USSR in last 3 years, India satisfies a very small part of the total imports made by it as it is one of the major importers of dyes and intermediates in the world.

United Kingdom

The United Kingdom is a well developed country having a population of 60 million people. It is also a major centre of textile industry. India's share in total imports of dyestuffs and intermediates is about 4%. The growth in exports in U.K. is about 20% for last 3 years. Production of dyestuffs has steadily declined in U.K. India has bright prospects for exports of reactive dyes, vat dyes and intermediates like H-acid, J-acid, tobias acid, gamma acid, etc.

Italy

Italy, till recently a large producer of dyestuffs has come out of the business and is a net importer at present. India claims a sizeable share in imports of dyestuffs by Italy. The present share is about 8%. The dyes required by this country are direct, sulphur and vat dyes. Italy is an expanding market and Indian exporters have very good scope to exploit the potential.

An analysis of world trend indicates that while the preference for synthetics would continue for some more time in the developing countries, so far as developed countries are concerned cotton may get reinstated, though not with the same supremacy it enjoyed prior to the intrusion of synthetics. It is anticipated that, by the turn of the century, the ratio of cotton to non-cotton may settle around 60:40. In the light of this, the group-wise export potential for different dyestuffs and intermediates for the years 1989-90, 1994-95 and 1999-2000 is shown in Table 6. It is interesting to note that the growth in the consumption of dyestuffs for non textile uses is higher than that for textile uses. The consumption pattern of organic pigments in the world is as follows:

Paint industry	: 30%
Printing ink industry	: 45%
Plastics industry	: 20%
Others	: 5%

Constraints

Although the opportunities for exports are immense, in reality the dyestuffs industry in India is unlikely to be able to exploit these opportunities in full because of several constraints. The main constraints are the high prices of raw materials, the high cost of services and the small scale of production. The erratic supply position of critical basic raw

Table - 6
GROUPWISE EXPORT POTENTIAL FOR DYESTUFFS & INTERMEDIATES
1989-90, 1994-95, 1999-2000

estuff group	1989-90	1994-95	1999-2000
id and direct dyes	2000	2800	1350
sic dyes	500	700	825
ptical brightening agents	100	150	175
rganic pigments/ Pigment dyes	1800	2500	2900
eactive dyes	2000	2800	1250
at dyes	1200	1500	1800
her dyes	400	550	700
tal	8000	11000	13000
termediates	10000	13000	16000

aterials and commodity intermediates as well as high pric-
g of such inputs by large public sector companies should
rectified. The cost of production is, therefore, very high
mpared to that in other industrialised countries.

onclusions

The important reason for the uptrend in dyes and intermediates exports is the stoppage of production in the developed countries on account of implementation of severe anti-pollution steps. In the zeal for higher exports, the lessons of these countries should not be overlooked. This means that the domestic dyestuffs industry has a good potential for growth -- both on the domestic and export fronts -- provided a coordinated development programme for the organised and small scale sector units is implemented.

Given necessary incentives, it is possible for the dyestuffs industry to emerge as an important thrust area on the export front in the coming years. Exports of inorganic dyes should be encouraged since they are more labour intensive and most of the raw materials needed can be met indigenously.

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Recent technological developments in consumer and industrial plastics

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UMMARY

Recent technological developments in the thermoplastics olymers like polyethylene, polypropylene, polyvinyl chlo-ide, ABS, polyesters, polycarbonates, polyamides, silicones, luoropolymers, polyimides etc. have been discussed. Cer-ain aspects in the new processing techniques have been also ncluded. Thermoplastic elastomers which is an emerging ield combining advantages of both plastics and rubber, have een also looked into.

NTRODUCTION

The polymer industry in India is of a relatively recent origin which made a modest beginning in the early 1940's. A thermoset, phenol-formaldehyde resin plant started on commercial scale in 1945 followed by other thermosetting resins such as UF & MF. Polystyrene was the first thermoplastic produced around 1957 and subsequently polyolefins were then commercially introduced around 1959-60. The industry however flourished only after establishment of petrochemical complexes in the country. A massive investment of Rs. 27,000 crores in petrochemical industry has led to easy availability of raw materials required for plastics manufacture which has also reduced the import of many of the raw materials.

The consumption of various polymers, including thermoplastics, thermosets, performance plastics and others was around 6,96,100 MT in 1988-89, estimated to reach around 8,00,000 MT in 1989-90 registering a growth of 15%. It is projected that overall consumption will be around 27,59,000 MT by turn of this century with an average growth rate of 11-12%.

1. POLYOLEFINS

Polyethylene, polypropylene and their copolymers are included in this group of polyolefins. LDPE is one of the most widely used grades in this group. LDPE finds wide application mostly as a packaging material for industrial as well as domestic purposes. Shrink wrap, flooring underlay and damp-proof membranes are the recent additions for use of LDPE.

HDPE has good chemical and impact resistance and consequently it is more suitable for blow moulded dust bins, industrial barrels, monofilament ropes, netting, extruded sheets, etc.

Table 1
POLYMER CONSUMPTION

(Metric tonnes)

Polymer	**1988-89**	**1989-90 (Est.)**	**2000**
A) Commodity polymers (e.g. polyolefins, PVC, PS)	6,14,000	7,02,000	25,16,000
B) Thermosets (PF, UF, MF, Epoxy etc.)	51,500	60,000	93,000
C) Performance and other plastics (e.g. ABS, nylon, acrylics, PET, PBT, etc.	31,100	37,400	1,50,000
Total	**6,96,600**	**7,99,400**	**27,59,000**

Outdoor applications of PE is limited by the susceptibility to photo-oxidation by UV light, necessitating the use of protective agents such as carbon black. Oxidative degradation at higher temperatures and susceptibility to creep even at room temperature are further limitations. Although HDPE is theoretically more resistant to oxidation than LDPE, in practice they behave similarly.

(a) Cabot Plastics, has introduced an IR absorber master batch, which improves the thermal barrier properties of polyethylene film used for greenhouse. The Polyethylene 9138 masterbatch contains a mineral based IR absorber which reduces heat loss during the night and prevents scorching and hot spots in daylight.

(b) Modified polyethylene: Du Pont Canada, has developed modified linear LDPE with a balance of stiffness and toughness at low temperature comparable to engineering plastics like ABS, polycarbonate and nylon. Compounding skills to modify and upgrade PE also include modified mineral fillers, surface treatments, flow modifiers, compatibilizers, reactive extrusion, blending and alloying. Improved compatibility of filler and matrix is said to achieve bonding in the new products that is chemically and thermally resistant, giving properties not seen before in PE. It has also been possible to load

PE with as much as 30% of liquid polybutylene, an additive which imparts cling properties to stretch film, without blooming from the pellets. Another lightly filled black compound for underground wire and cable application has advantage over conventional PE which cannot be used in this application because high shrinkage rates would allow moisture to penetrate the cables which are required to have minimum service life of about 40 years. A 40% mica filled product provides paper like feel in film for use in multilayer courier pouches. Its crease-fold properties also suit it for butter wrap. Another non-halogen fire retardant agent filled compound has greater than 50% loading by weight of alumina trihydrate. An additional development is a technique for encapsulating upto 70% by weight of liquid into free flowing pellets, which could avoid liquid use and results in improved delivery.

(c) HDPE in structural applications: HDPE is limited in structural applications by its low stiffness and high creep properties. However, by reinforcing the polymer with a stiff, strong filler this limitation can be overcome. This study investigates the potential for improving dispersion in and adhesion to HDPE matrix by adding a third component with the goal of obtaining a composite structure with improved impact and tensile strength. The HDPE composite can also be recycled .

(d) A new developmental high clarity resin is intended for such applications as candy-wrappers, co-extrusion, overwrap, high quality merchandise.bags and other applications that require film with high stiffness, good clarity, high gloss and low gel contents,but where toughness is not a high priority. The resin has medium molecular weight and narrow molecular weight distribution and has a processing similar to LDPE. Its high clarity is obtained without resorting to any post extrusion stretching or annealing process.

The high clarity films are being used for applications in conscious markets. The resins have high bubble stability and very low gel content. The resins find market in bakery product packing and laminating film.

(e) Mitsui has developed a new grade of Ultzere very low density PE VLDPE, VZ 15 100°C) for the production of extrusion coated multilayer film for form-seal applications. A new catalyst system is used to produce a resin with a very low molecular weight. Traditionally, the polymer molecular structure limits the degree to which the melting point can be lowered. But by producing a resin with a narrow composition distribution or degree of branching a vicat temperature of 90°C has been achieved. Low temperature sealability, clarity and blocking are all improved. Puncture resistance and thermal stability of films coating with the resin are claimed to be better than those which are achieved with either EVA or ionomer.

(f) The chemical group of DSM has added Stantylon UH an ultrahigh molecular weight PE to its range of engineering plastics. The new highly weather-resistant polymer is available in three different grades. Stantylon UH is a grade supplied in powder form and has a molecular weight 2-5 x 10^6 which is 10-100 times higher than that of LLDPE. This high mol. wt. gives the product special properties such as high wear and impact resistance even at very low temperatures, high toughness and a high resistance to chemical ageing.

The company expects these grades to make the product attractive to a range of industries from sports and leisure to transport.

2. POLYPROPYLENE

Polypropylene is a versatile resin. It can withstand the temperatures used in sterilisation, and is not subjected to environmental stress cracking. It is however subjected to creep and its use under continuous loading of high stress is not recommended.

(a) However, with the advancement of technology this is used as an engineering plastic and is substituting a range of expensive plastics and metals used in the automobile appliances, consumer products, electronics and other equipment markets.

The new products are a complete line of Hifax thermoplastic olefine (TPOs) and a range of glass reinforced materials called Hi glass. The Hifax thermoplastic olefins span the complete spectrum from rigid to pliable materials. They are said to provide an improvement in processability and a better balance of impact strength vs stiffness. They have begun replacing a number of engineering plastics in U.S.

(b) Microwavable and boilable food trays have been made from Propathene PP (ICI). Propathene performs well in food applications. It has good barrier properties, resistance to chemicals and high temperature tolerance. It is used for inner and outer skins and has an EVOH layer inbetween.

(c) Horizon polymers a division of Ferro Corporation specialises in products for medical applications. Foreseeing a move away from PVC in this market, the company has developed a range of polyolefins as replacement material.

One of these developments is a range of ultra melt flow resins, controlled rheology polypropylene materials for melt blown applications. Homopolymer products are available in melt flow range of 150 to 1500 and copolymer grades are available in melts of 600 and 1400. Designed specifically for fibre formation via the melt blown process, all grades offer maximum production at a given melt flow and low smoke generation during processing.

(d) Also new are V-3290 RB and V-4291 BR medical tubing polyolefin alloys. The materials are non-plasticizer containing olefinic compounds designed specifically for medical device tubing requiring super-resistance to extraction by blood lipids and high fat emulsions. Features include gamma and ethylene oxide sterilization, compatibility, solvent bondability, higher strength to weight characteristics than PVC, excellent contact clarity, radio frequency (RF) and heat sealability and low specific gravity than PVC.

3. PVC

PVC in rigid form has generally good chemical stability and weatherability. Rigid PVC processing affects end-use stability. The plasticized PVC stability is almost entirely controlled by the type and amount of plasticizer and stabiliser.

(a) PVC speciality resins are produced via a patented polymerization process said to be capable of yielding material with absorptive capacities in excess of 100 parts polymeric and phthalate plasticizers. They can be alloyed with polycarbonate, polystyrene and ABS.

(b) High heat transparent PVC: Monsanto Chemical Company of Brussels is developing a new polymeric modifier giving previously unobtainable heat resistant properties to transparent PVC:

Elix EX 3610, which is food contact approved, has been specially tailored for injection moulded applications such as jelly moulds, microwave oven trays, lids, business machine instrument covers and appliance parts.

The level of heat resistance depends on the amount of modifier added to PVC. 20% Elix EX 3610 can improve PVC by as much as 30°C (heat resistance). A further advantage is that PVC is naturally flame retardant. Adding Elix EX 3010 to transparent PVC gives a product that is heat and fire resistant at significantly lower cost, it is claimed, than other high heat and IR transparent products.

4. ABS

ABS plastics, tough and resilient and chemically resistant but readily processed are employed in the form of injection mouldings, extruded pipes and profiles. Their main applications are of engineering kind.

(a) A TV manufacturer uses a flame retard grade of ABS to achieve a combination of vibrant colors, superb molded finish, good color stability and excellent heat resistance in the cabinets of their 9-inch portable TV sets. Using ABS eliminates the need for secondary operations such as painting or laminating the molded part. The manufacturers also chose ABS for its heat deflection temperature (190°F) because the sets generate considerable heat in a small space. ABS has excellent resistance to impact and UV radiation.

5. POLYESTER

I. Crosslinked polyester:

Crosslinked polyester can maintain good mechanical properties over a period of years, but the composition, type of reinforcement and degree of cure can strongly influence ageing performance. Discoloration from outdoor exposure is minimised by inclusion of UV absorbers. Glass reinforced structures account for 85% unsaturated polyester production.

(a) Ultra smooth RP moulding compounds: Polyester moulding compound that produce parts with very smooth surfaces are formulated to meet transportation industry standards for Class A surface finish in vehicle exterior components. Surfaces are also free from long wave irregularities and they are highly paintable.

(b) Specialities from DSM marketed under the trade name Daran: DSM resins has introduced speciality systems viz.

Daran 11 is an unsaturated polyester resin combining high HDT to 220°C with good electrical properties and chemical resistance. Applications envisaged include, coating for electrical items such as ballasts and lamp bases, insulating laminates for high voltage transformers and heat resistant electrical components and under-the-bonnet parts such as cylinders, head covers and oil pans.

II. Thermoplastic Polyester:

They are little affected by moisture and heat, are resistant to organic liquids and reagents. Exterior weatherability is good.

(a) Cookware from freezer to oven to table. The crystallized 20% glass fibre reinforced PET (Kftar FBPG 220 pmc from Eastman Performance Chemical Division) cookware can travel from the freezer to the microwave or conventional/combination oven and to the dinner table without changing dishes. The polyester material can withstand high temperature upto 210°C and low temperatures down to -40°C and is resistant to chipping, cracking and shattering.

(b) Plastic spice bottles: A line of spices is now being marketed in clear bottles, injection blow moulded from polyester. The spice company previously used non see-through cans glass and opaque polypropylene. The new bottle provides protection clarity, product compatibility and shatter resistance. Material is approved by FDA.

The Rice Grower Association of California has introduced Hinode California Harvest long grain rice in a zippered resealable packaging. The flexible package is a laminated PET structure containing an EVA sealant layer. The rollstock is prepared flexographically. Consumers reported that packaging allows them to measure portions easily from within the bag without having to pour the rice into a carrier.

(c) Crystalline Cookware: A cookware which is said to give outstanding performance in microwaves, as well as temperature resistance up to 230°C in a conventional oven, has been developed by ICI Advanced Materials. Called the Melinite range, the cookware is manufactured in reinforced crystalline thermoplastic polyester (PET).

(d) Flat lenses made out of polyethylene terephthalate glycol are tough and deliver 50% greater candle power than flash lights with conventional bulbs.

(e) Superior barrier to plastic film with glass: A transparent inorganic super barrier that is claimed to surpass existing barrier resins is obtained by using vacuum deposited glass as an ultra-thin flexible barrier layer on PET film. This shelf stable retortable pouch combines the advantages of aluminium foil and high barrier resins while adding new protection value of its own. Unlike aluminium coated printed structure which tend to delaminate under high temperature and humidity, the glass-coated barrier film can be retorted without major loss in moisture or oxygen barrier. At about 50 nm, the microscopically thin barrier layer loses the brittleness of glass and becomes flexible enough for normal thin film converting operation.

6. POLYCARBONATES

Polycarbonates find utilisation for dimensionally stable transparent moulding particularly where impact resistance is needed. Good electrical properties are maintained even at elevated temperatures. Polycarbonates relative to other thermoplastics, show good resistance to ionising radiation.

(a) Polycarbonate compounds: Three grades of Beetle polycarbonates from BIP chemicals comprise an easy flow, fast cycling grade and medium and high viscosity grades. Variants of these feature improved mold release and high UV stability. The basic grades have a heat distortion temperature 135°C and a high impact resistance is retained down to -40°C. Transmittance to visible light is between 85 and 91%.

(b) A PC/ABS blend, Bayblend T 45 MW, from Bayer AG is being used in the form of housing to protect the sensitive internal components of new microelectronic heat consumption gauge from mechanical and thermal damage electrical influences.

The thin section light weight mouldings which make up the housing are produced by low cost injection moulding. The housing sections are impact and fracture resistant and offer heat resistance to about 100°C. The gauge permits exceptionally accurate assessment and domestic heat consumptions and enables costs to be apportioned fairly among individual consumers, for example residents in a block of flats with a central heat supply.

(c) Sign making blend from GE plastics: Impax sheet from GE Plast, a polymeric blend based on an opaque polycarbonate matrix system, is finding applications in sign making.

The material offers high impact resistance over a wide range from -40°C to +120°C and good chemical resistance. Impax also has good vacuum characteristics with high deep draw ratios and low thermal expansions.

7. POLYAMIDES

Polyamides in general, are dimensionally stable. They undergo oxidative degradation on prolonged exposure to sunlight or heat. Polyamides are attacked by strong acids and bleaching agents but show good resistance to alkalis.

(a) An engineering polymer from Rhone Poulenc, Technyl, a 246 polyamide is now being used in sports and leisure market. A new ice skate design from Kovopol of Czechoslovakia, has the material replacing steel for the boot's supporting section. The resilient material will enable the ice skates and in particular hockey skates to resist tough treatment.

(b) Nyrim, an RIM nylon, is being used in the production of packaging material and containers, particularly for aeroonautical and military applications. Nyrim's physical characteristics include high impact strength, good wear properties and high chemical and temperature resistance with or without glass fibre reinforcement. Processing flexibility is enhanced by short cycle times and low mould costs and the ability to form complex shapes.

(c) Transparent nylon improves molding efficiency: Grilamid TR55 FC, transparent nylon 12, increases productivity of hard to mold parts. It has fast cycling, easy flow characteristics which make it desirable for injection molding parts with complex designs, thin sections or long flow paths. In extrusion, very high product rates with tight dimensional control can be achieved. In addition, it has low specific gravity for light weight parts and more parts per pound. The material is also tough and resistant to chemicals, stress cracking, yellowing UV radiation, and hydrolysis. A combination of low moisture absorption with a low coefficient of thermal expansion results in excellent dimensional stability. The nylon accepts color readily and molds to a high gloss finish providing application which include electrical, electronics components for both air or water filter bowls, flow meters, glasses, bath and kitchen fixtures and extruded tubing, sheets, etc.

8. SILICONES

Silicone resins cover a service temperature range from -100°C to 250°C (life upto 6 months at latter temperature). They have exceptional water repellence, have high resistance to oxidation and chemical attack, and are not subject to fungal or bacterial attack. Silicone rubbers have less fire risks than organic rubbers. Silicone rubbers resist oxidation, chemical attack, and high energy radiation. They are tasteless, odorless and physicochemically inert.

9. FLUOROPOLYMERS

The fluoropolymers are unaffected by long exposure to exterior weathering and sunlight. They have excellent electrical properties (maintained over a wide range of frequency, temperature and humidity), chemical inertness, thermal resistance and non-adhesive properties.

(a) Possible alternatives of CFC's: The most important alternatives to CFC's being developed in Europe are the hydrofluoroalkanes (HFA's). These are said to be very promising for many uses and are undergoing extensive toxicology tests as to safety and effect on the environment.

(b) Hi-tech teflon: 51 years after the discovery of 'Teflon' Du Pont has announced the latest generation of fluoropolymers with a new family of resins.

Teflon AF, amorphous fluoropolymers have optical, heat and electrical characteristics that are said to far exceed the current grades.

Potential uses include circuits and optics for high speed computers. As data transmission speeds increase and integrated circuit chips become dense and more compact, Teflon AF has the electrical properties necessary for the next generation of circuits. It has the lowest known dielectric constant of plastics, low moisture absorbance, good dimensional stability and temperature resistance upto 300°C.

Its electronics applications include dielectric layers for high density integrated circuitry passivation layers, dielectric for high performance flexible circuits, encapsulation and dielectrics for hybrid sandwich, integrated CKF packaging.

The new fluoropolymers are unusual because of their limited solubility in selected perfluorinated solvents, which makes them easier to process for casting thin films and coatings. Teflon AF, resins are stiff, creep-resistant and inert to chemical attack. They can be fabricated into thin films and coatings and moulded into parts that function in high temperature, harsh chemical applications such as in semiconductor processing.

Low surface free energy, low moisture absorbance and solution coating capability combine to make Teflon AF suitable as a release material. It can be applied in coatings of less than a few microns.

10. POLYIMIDES

(a) Portable emergency breathing apparatus has been introduced by Du Pont which protects the wearer for upto 20 minutes from smoke, toxic fumes and low oxygen ambients, allowing him to escape from dangerous environments.

(b) Toughened BMI: BP Advanced Material's V391 is a series of prepregs that are based on a very tough bismaleimide resin, intended for such aerospace applications as wings fuselages on stabilizers. The resin has excellent hot/wet properties to 177°C. T_g is 262°C dry, 209°C wet. It has good flow properties and cure cycles are simple. It produces little or no odour.

(c) Specialities from DSM: Daron XP 21 is a polyesterimide resin for applications which require a higher heat in combination with a high level of mechanical strength. It has an HDT of 235°C of a class: C rating. This rating means that the resin can withstand a temperature of 200°C for 20,000 hrs whilst the mechanical strength is still in excess of 50% of the initial value.

10. POLYMETHYL PENTENE: COMPETITOR TO PP

Polymethyl pentene (PMP) made by using a dimerization process that reacts propylene molecules to form 4-methyl pentene-1 monomer and polymerizing the same to form PMP. Distinguishing features of PMP are: (i) very low density 0.835 (PP lowest 0.905), (ii) excellent thermal properties as shown by 240°C crystalline m.pt. (PP 165°C), (iii) high temperature and easy processability. Because of high thermal resistance PMP or PMP/PP blends could be made into fibres competing with PE fibres. Other uses expected are carpet backing, multilayer container and coatings.

Processing

Polymers can be processed by a variety of techniques like injection, blow, compression molding, extrusion, etc.

Various developments have taken place in the processing technology of which a few have been cited over here.

a) "Push-pull" molding orients fibres, molecules to order

Injection molding techniques now close to commercialisation produce highly oriented parts from liquid crystal polymers (LCPs) and fibre-reinforced plastics, virtually free from weld line defects. Mechanical properties exceed those stated by the suppliers of the materials and approach those of metals.

The new "push-pull" technique makes use of orientation phenomenon to produce parts that have a layered structure rather like plywood, with highly defined but integral layers of material oriented in different planar directions in one plane. Moldings made using these techniques have an isotropy that can be modified to the application. This overcomes one of the major limitations of LCP and fibre-reinforced plastics molding, namely the tendency to concentrate mechanical strength in the flow direction, leaving the transverse direction weak and in extreme cases causing parts to split like a piece of wood along the grain.

And with the new technique, it is possible to virtually eliminate weld lines during the molding process. The technique uses a multiple feed that enables the processor to subject material in the melt to various oscillating forces as it cools and freezes. Changing the direction of these forces changes the direction of orientation. It is possible to orient material right through to the core; this contrasts with conventional injection molding, where orientation is largely a surface effect (1).

A new process called insert compression blow molding has been patented by Container Corporation of America to make one-piece shipping drums with an integral handling ring. The process differs from an older European one for making drums with an integral lift ring in that the CCA method produces the ring from an additional plastic strem fed to the mold, rather than compression molding it from a folded-over section of the same portion used to form body of the drum (2).

A new injection molding technology based on compressive filling of the mold and articulated tooling has been introduced by GalicMaas Ventures, USA, to produce polycarbonate compact discs for audio recording.

The new method has been claimed to boost audio CD productivity by as much as 400%, slash molding stresses and birefringence, permit greater process automation with hot-runner systems and upto four-cavity molds and permit use of stiffer low melt-flow PC to improve flatness and surface replication in more critical computer applications like erasable CD-EPROMs or hard discs (3).

A new metallizing process has been introduced to improve shielding of reinforced plastics components against electromagnetic interference (EMI) by incorporating fibres that are precoated with thin layers of metal. Bayer, which developed the process, has also introduced a new system for shielding molded nylon parts.

In the first process, glass fibre rovings are electroless nickel or copper plated. Rovings that are coated with 10 to 20% by weight of nickel will provide shielding against radiations over 300 MHz. They can be incorporated into sheet molding compound (SMC), or they can be processed by spray-gun or filament winding. Fibres that are coated with 15% copper can be processed by similar means to provide shielding at lower frequencies; rovings coated with 30% copper are intended for incorporation into thermoplastic injection molding compounds, and there is also nickel-plated fibre flock for use in thermosets. Bayer reports that other types of fiber can also be coated by the process. Copper-coated fibres can be protected against oxidation by a thin film of nickel.

Very high adhesion between metal coating and molded nylon parts can now be achieved by pretreating parts with Baygamid activators. The use of the activators also greatly simplifies pretreatment (4).

A special kneading/plasticating screw claimed to yield exceptional mixing uniformity in commodity, engineering or high technology thermoplastics is the key feature of Toshiba's IS-F line of injection molding machines. A new braking system for mold opening and closing greatly decreases dry cycle times compared with earlier Toshiba machines. A multistage hydraulic pump minimises energy consumption by matching oil flow to specific operations during the cycle.

The control system incorporates memory for 30 molding conditions. This can be expanded to 60 conditions by use of extra cards. A preventive maintenance package facilitates machine servicing by indicating when regular inspections are due and provides estimates on service life of components under various conditions of use.

THERMOPLASTIC ELASTOMERS (TPEs)
(Bridge between thermoplastics & elastomers)

A major change is taking place throughout the world in the rubber and plastic industry, due to enormous commercial growth of thermoplastic elastomers (TPEs). TPEs have functional properties of conventional thermoset rubbers (such as NR, SBR or Neoprene) and the processing characteristics of thermoplastics. The microstructure of TPE contains a crystalline domain within an elastomeric matrix and crosslinking gives it rubbery characteristics.

Interestingly, those who know how to fabricate articles from TPEs are in the plastic industry, whereas those who ow how and where to market these articles are in rubber dustry. The very nature of TPEs is forcing better comunications between these two industries.

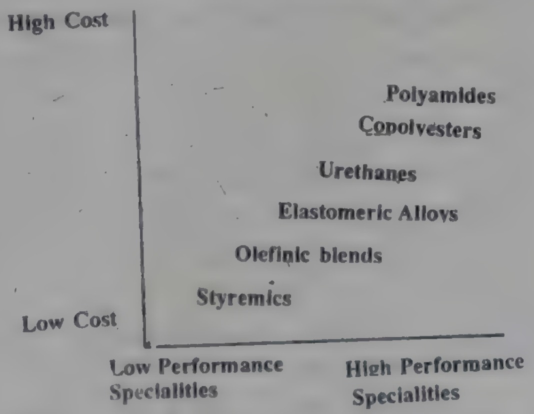
rowth of TPEs

From a modest beginning in the late 1950's, TPEs have ecome a significant factor in the industrial rubber goods hich have captured approximately 8% of the entire indusy. TPEs have emerged as a vital and dynamic growth indusy by deep penetration into the market and according to arket researchers TPEs will grow at a rate of 10-12 perent, as compared to present growth of only 2-4% of conentional elastomers. The traditional rubber industry will be acing a tougher competition from TPE manufacturers. The ecent figures have shown about 0.5 million tonnes per annum f TPEs production. In 1985, total sales of TPEs crossed 482 illion lbs in USA with total consumption of one billion lbs orldwide. If the world economy maintains its current growth ate; the US will alone consume over 1 billion pounds per nnum while worldwide consumption may reach over 2.5 bilion lbs per annum by end of this century.

Classes of TPEs

The major six types of TPEs are known as follows:

1. Styrenics
2. Olefinics
3. Elastomeric alloys
4. Urethanes
5. Copolyesters
6. Polyamides

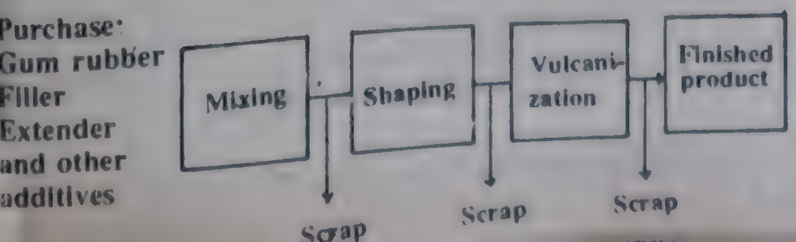


From these six main classes, about 40 different types of TPEs are produced by over 30 companies over the world.

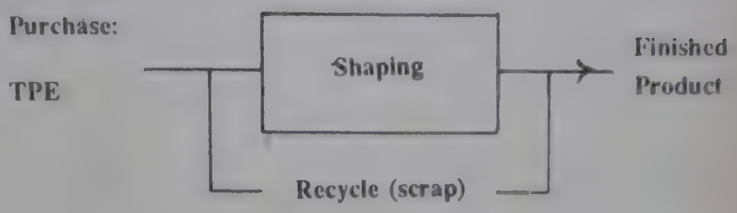
Processing

There are definite advantages of TPEs production over conventional rubbers which can be illustrated from the following figure.

Combined Rubber Products



TPE Product



TPEs offer a rapid, efficient, simpler and economic processing of goods than for rubber based products. Processing times are much shorter and scrap can be reused which carries a large amount in conventional rubber article manufacture and finds less/no utilisation by way of recycle or utility.

TPEs can be processed by almost all the processes used by thermoplastic manufacturers, e.g. compression, injection mouldings etc. A number of methods such as blow moulding, thermoforming and heat-welding, which cannot be employed in thermoset rubbers, could be used in TPE processing.

Advantages of TPE

1. Little or no compounding
2. Faster and simpler processing
3. Shorter cycle time
4. Lower energy consumption
5. Tighter product tolerance
6. Lower specific gravity

Disadvantages

1. Newer technology for adopting
2. Requires drying before processing
3. Low hardness TPEs are very few
4. TPEs melt at elevated temperatures.

Applications

The uses of TPEs are as numerous and extensive as those of thermoset rubbers. Except for some major applications in reinforced articles such as fires and air-springs, TPEs are finding large applications.

Automotive uses offer a very promising market since nearly half of the rubber in today's automobile is non-tyre. Under-the-hood applications are met by TPEs. Hoses, gaskets, seals, bushings, weather strippings and electrical insulations are made with TPEs.

Elastomeric alloys of TPE are widely used for architectural and construction purpose such as window seals and glazing systems.

Today's modern appliances – dish washers, power drills, telephones and equipments contain a variety of articles prepared with TPEs. The use of TPEs in contact with food and for medical use are growing due to non-toxic nature of many TPE types.

TPEs also find extensive uses as electrical insulators both as primary insulation and as jacketing materials.

In India, many rubber based materials are found to have less durability, due to ozone degradation and cracks. TPEs would have definite place for such applications e.g. bicycle handle-grips, pedals, hoses for agriculture applications etc.

Appendix

An on-line system for accurately weighing injection molded parts immediately as they drop out of the mold is connected directly to the molding machine's closed-loop control, for quality and process-control purposes.

The system has been developed by Battenfeld, Austria and is best suited for weighing very small parts that do not need to be manually or automatically unloaded from the mold. A scale is fixed on the machine under a discharge chute leading from the mold. Parts drop into the center of the scale through a special centering system. This then swings away, and the scale is hermetically sealed. The parts are then weighed to an accuracy of 0.001 g. This process takes 3 to 4 s. The part is then blown off the scale. Parts falling outside set tolerances are blown one way, good parts are blown another way.

The weighing system is integrated with the injection machines. Unilog 4000 control parts weights can be displayed and logged for subsequent analysis.

The system can also be used as a process control tool when the molded part first hits the scale, an initial reading is taken to an accuracy of 0.1 g. This is sufficient to tell if any part of the molding has been left in the cavity. If the reading is too low, the machine will automatically stop before the next cycle, thus avoiding any possible damage to the mold (5).

Conclusion

The information summarized in the paper specifically brings out the efforts to modify/improve the commonly used polymers so that some of their shortcomings could be minimized, if not eleminated. Developments of totally new polymers has become not only expensive but very time consuming. Voluminous work is also being carried out in developing new products by blending polymers and preparing composites with tailor-made properties.

Plastics have gained importance mainly because of their ease of processing, energy saving, possibility of mass production thereby reducing the cost and versatility to suit a broad spectrum of applications right from consumer goods to high performance products. The continuously felt need for replacement of conventional materials like metals, wood, ceramic has helped to improve the properties of plastics to match them with those of the currently used products. The combination of plastics and rubber has added to further replacement of many elastomeric material which were mainly based on natural resources so far. Looking to present trends the growth of plastics appears to be phenomenal in days to come.

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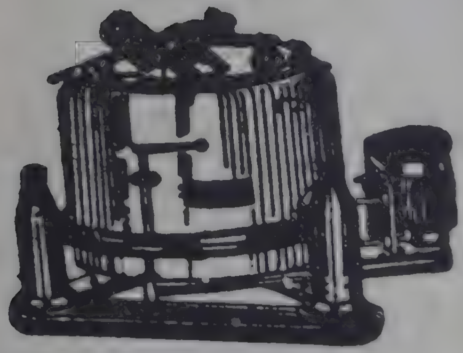

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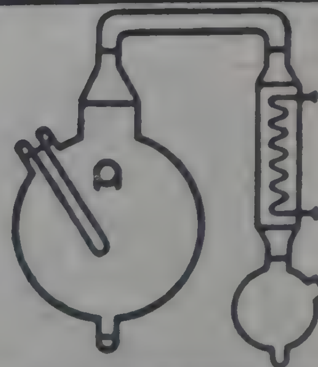

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Industry's Perceptions on Leather Product Sector*

R. MURALIDHARAN

The Craftmen Private Limited, 808 Mount Road, Madras 600 002.

There can never be a single perspective of an Industry which consists of differing groups. At the best, a spectrum of opinion could be evolved.

It is the opinion of some people in industry that the product sector has not done as well as anticipated. This can be a true assessment of the state of industry and the reasons are not too difficult to find. While there are many reasons for failure, we will specifically analyse the perceptions of the Industry to arrive at certain conclusions.

The first question one has to ask is whether we are progressing or not. The answer is refreshingly affirmative: yes, we are progressing; but, we cannot, however, claim that we have no problems. Some of these problems are such that we have no control over them whereas there are other difficulties, over which we have direct control and can endeavour to overcome them. It will be wiser first to concentrate on the latter, identify them in order to remove the obstacles from our path of progress.

Let us, for example, take the development of trained operators required in our industry. There are so many efforts to improve their availability; but yet no one is satisfied with what is going on. Logically, it is a problem of the industry and it has to solve it. On the contrary, there is a heavy reliance on external bodies like CLE and CLRI. Efforts which the industry should do by itself has been passed on to a second, if not to a third party.

In this connection, one may legitimately ask: what stops likeminded persons, who want to invest on plant and machinery in order to earn profit, from joining together to develop trained personnel. If collective efforts cannot be made, instead of complaining, why not a committed individual take the training upon oneself? Afterall each unit needs certain limited number of operators which it can identify and train in a time bound manner. Training and technology are closely interrelated and this way, the industry has the first hand opportunity to improve its technology. Often new entrants find it difficult to get an entry firmly into the market. While machine technology can be bought, one has to earn a market. The earned market should be sustained. Therefore, the new entrants should not regard marketing as an end by itself. Instead of concentrating on marketing alone they should pay attention to technology, product development and other related actions.

This point is being raised here, as many entrants enter into the scene, accept orders which they cannot fulfil and in the process not only demoralise themselves, but earn a bad name for the Industry as a whole. Therefore, the new entrants with aspirations to sell a product should pursue it with a measure of national spirit. Of course, this is equally applicable for established units also.

Let us hear another patriotic voice! There is always a group existing in this industry which will piously declare: "India is not inferior to any other nation in technology. Given the right opportunity and support, Indians will rise up to any standard, etc". Such a spirit while laudable and popular buries under it the hard fact, that we should ensure a great deal of improvement in our system of working. With such emotional outbursts, great misunderstanding takes place among general public at large and when regulations are to be suggested to the Government of India, it becomes a hard task to bring them to the truth that we have to move a long way in technology.

On the other hand, there is another group which forms the other wing of the patriotic ones! This group imagines that just short of magic everything is done in the western world in the product Industry. They imagine that these magics cannot be performed here in India and therefore, we can do no improvement than what we have done. Actually, this impression is harming us equally. What is going in the West is nothing but, a disciplined industrial activity. Quality is built step by step, brick by brick. While new bricks are added on, it has to be checked that old bricks do not slip away.

Raw Material Shortage

This problem of the Industry is genuine and difficult to tackle. There are several reasons for this situation. Firstly the world demand has risen for leather and secondly our raw material comes under newer distribution channels dislocating their availability. Product sector seems to suffer from both price escalations and non-availability of finer leathers, such as aniline finishes, in sufficient quantities.

Indeed, the latter is a serious threat to industry's development. Unless, we start using better leathers, we cannot move up in price ladder in the international scene. To occupy a prominent place in the world market, not only do we lack enough leather but also technological management techniques. By making a few samples, we only familiarize ourselves with the product technology. The need, however, today is scale-up knowledge which primarily involves institutional management of technology and management of skill. The biggest problem for our development has been the attitude of industry which always treats itself as exclusive and claims that this cannot be brought under normal category of technology treatment,

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* Paper presented at T.G.T-CLRI, 1990.

This leads the industry more and more on a traditional path and one can say, that this has been the single biggest contributing factor for the slow rate of growth in the country. Unfortunately, excellent institutes such as CLRI have not been able to contribute to resolving this situation for one reason that the doors of the industry seems closed on this subject and on its part, CLRI has not made enough noise though it could be said that it has tapped the door of the Industry!

Although there could be selective exceptions to the above inferences, the question here is "what are the overall perceptions?" By statistics alone certain factors may not come to light. As an illustration, a balance sheet, although can give a profitability ratio, cannot indicate the measure of stability of that company. Certain losses have to be accepted for certain future gains. A factor which cannot be left without mentioning in this subject is the need for consumer focus. The product sector should develop a sense of consumer focus on a global market. What matters for long term development is consumer focus. On the other hand in India, the situation is to the contrary. It lacks focus. The average manufacturer here does not consider the consumer satisfaction as the prime factor of development.

Silent failure

Just imagine a case: A wallet made by an Indian firm and brought in Federal Republic of Germany is purchased by a Muller or a Schmidt from a department store. After a few days use, the consumer finds that the coin pocket is torn apart at the stitch and gets annoyed! He does not complain but he never returns to the stores from where he purchased it! This could be termed a silent failure. No complaint, no words, but, there is no second sale either. Manufacturer never gets hurt directly, nor is he even aware of it because of the non-communicative attitude of the buyer. On the contrary, in the absence of a complaint, manufacturer believes that everything is right about the product.

A single failure, if analysed, probably can reveal a lot of information in matters relating to the quality, consistency and reliability. The standing example is the aircraft Industry for this. A simulated atmosphere of the consumer, can be always planned by the product maker and it is not expensive or impractical. If real efforts are made to give a consumer focus, long term goals can be achieved. Good companies today in other sectors surely have developed concept and why not we in the leather product industry?

There has been a systematic policy change on the part of the Government to move from semi-finished leather to the product sector. But what has happened in this changeover is that many entrants which are large in size and strength have rushed in resulting in generalisation of the product rather than specialisation. Generalisation generally yields less profit whereas specialisation pays handsomely, but on a smaller scale. The Industry offers scope for both styles of operation and the dust wil settle down eventually bringing in equilibrium. The often debated point on this is, why should tanners enter the field of product line. Why not, if he wants to? But the question here is that whether under same management the termination line between the two Industries can be preserved as the weakness of one wing should not be passed on to the other wing. It is upto any free person to take a view whether he should enter both the fields. If he has the professional competence, he will succeed.

The argument can be whether the Government has initiated an unhealthy rat race? It looks so, on a temporary basis. But it has been evolutionary elsewhere whereas it very much looks like revolutionary in India because of the mixed entrants into the scene. The other reason in India for the rush has been, lack of development of High Tech industries in good measure. This has resulted in bigger companies entering into the leather field whereas in all the western world, big units have kept off from leather industry as they had fascination to develop newer areas of science rather than leather.

The need to place import of finished leather under open general licence without any import duty is a well thought out plan in this context. In order to reach healthier position soon, this import policy must be pursued without hesitation.

While the above factors and the associated difficulties are under the direct control of Industry, what the Industry cannot solve by itself is the problem relating to policies of import of textile linings, fittings, spare parts for their imported machines with some degree of flexibility and lastly, air cargo space.

It is quite possible that one day, the industry limited to the air cargo space availability may limit the size of the industry and, therefore, targets should be kept based on this factor! There is no irony in this statement "one needs to experience this matter to realise the truth of the above statement. With all the above difficulties, what happens in India is surely development. All we have to work for is to accelerate its pace.

LEATHER ABSTRACTS

TCMTB BINDING AND ANTIFUNGAL ACTIVITY IN WET-BLUE LEATHER. W.M. Fowler and A.E. Russell. *J. Soc. Leath. Tech. Chem.* **74,** 107, 1990.

The uptake and antifungal activity of 2-(thiocyanomethyl-thio)benzothiazole (TCMTB) active ingredient emulsion dispersions of Busan 30L on chrome-tanned wet-blue leather has been investigated at 10°, 25°, 40° and 55°C. At lower fungicide treatment concentrations, binding tended to follow a typical mass-action binding isotherm, increasing slightly with temperature upto 40°C. At higher float concentrations, an inflexion point was apparent beyond which uptakes showed a marked increase with concentration. The inflexion point signifying a change in binding characteristics, occurred at progressively lower concentrations with increasing temperature. Comparison of the various storage performance tests indicated that dosage-storage response was poor under conditions of continuous fungal exposure in the humidity chamber and potato dextrose agar tests compared with moist incubation, especially gets surface extract of TCMTB. Results of the study provide a further insight into the mode of interaction of TCMTB emulsion dispersion with wet-blue leather, the importance of emulsion stability in practical application and role of bound and unbound fungicide in anti-fungal activity.

THE HETEROGENOUS INTERACTION BETWEEN SULPHOSYNTANS AND COLLAGEN -- Part-V: POLYELECTROLYTE COMPLEX TYPE. Z. Vinklarek, M. Vondruska and J. Kupee. *J. Soc. Leath. Tech. Chem.*, **74,** 116, 1990.

The stoichiometry of the above reaction has been studied with regard to its dependence on reaction conditions. An ight for collagen study. By comparison of the determined effective equivalent weight with the calculated values, the type of local Coulomb's interaction and also the type of the polyelectrolyte complex formation of this pendent-pendent type occurs. This has been substantially confirmed by elemental analysis.

DRYING OF LEATHER WITH MICROWAVES. M. Komanowsky, *J. Am. Leath. Chem. Assoc.*, **85,** 131. 1990.

The characteristics involved in microwave drying of leather was studied at atmospheric pressure under vacuum. The temperature of the leather during drying was varied over a wide range of varying the energy input, by increasing the air flow in microwave-assisted hot air drying and by increasing the vacuum. Experimental data are presented, describing temperature build-up and drying rates as functions of moisture content and drying time. Differences in physical properties and area yields at different conditions are also discussed.

COMPUTER MEASUREMENT OF THE SHRINKAGE TEMPERATURE OF LEATHER SAMPLES. Mantysalo, ESA. *J. Am. Leath. Chem. Assoc.*, **85,** 142, 1990.

On the basis of the 'standard' SLP 18 (or IVP/16) the measurement of shrinkage temperature of leather samples is rather tiresome. However, shrinkage temperature is a fundamental measure in fur- and-leather science. Hence, there is a great demand to develop a computerised method of measuring the shrinkage temperature for research laboratories as well as for fur dressers and tanners. In the present work, a system is described which can measure upto 12 leather samples during unloading by using a special apparatus and a microcomputer with a data-conversion board on the bus. A temperature equaliser accuracy of 1 degree Celsius.

GELATIN REACTION PRODUCT AS ALTERNATIVE LEATHER FINISH. G. Manzo, G. Ummanino and L. Bianchi, *Cuoio*, **65,** (5), 379, 1989.

This paper suggests the possibility of utilising a reaction product prepared by reaction between methyl methacrylate or acrylonitrile and gelatin extracted from chrome or unchromed tannery residues. The resulting polymer can be produced *in situ* by means of sodium persulphate. It has been demonstrated by the authors that a true grafting occurs as can be inferred from chemical and IR analysis. A comparison between the tensile strength and extensibility of the films of these copolymers and those of the same gelatin with casein films gives very favourable results. These support the possibility of the investigated materials replacing casein finishes.

RECOVERY OF CHROME FROM TANNERY WASTE. F. Knaflic, *Leder*, **41** (4), 61, 1990.

In order to meet the increasingly stringent requirements demanded by law on the CrIII content of treated effluents and sludges, it will become necessary to recover chrome from residual chrome tanning liquors and wash liquors in addition to achieving a substantial reduction in the chrome content of retanning liquors. The author states that upto 20% of the chrome in wet blue leather is stripped out in the retanning bath. This chrome is said to be difficult to precipitate and presents maximum problems in the subsequent effluent treatment. It is claimed that anionic polymers of small particle size show marked advantages over the dicarboxylic acids now commonly used for enhancing chrome fixation. The range of applications is said to be broader, resulting in simpler process control with reference to leather properties and area yield.

NEW DEVELOPMENTS IN LEATHER TECHNOLOGY

ECONOLOGICAL FINISHING SYSTEMS FROM COLOUR-CHEM

Colour-Chem Ltd. have developed a new finishing system for leathers that avoids a pollution loaded volume of organic solvent based coating of conventional lacquer finishes. The finishing system is devoid of solvents but at the same time maintains the required quality parameters of the finished leather.

For example, in the finishing of shoe upper leathers, the objectives are to finish it in the desired colour with satisfactory basic properties such as surface smoothness, good break, dry and wet rub resistance, a pleasing handle and with minimum possible variation from the crust feel. The present conventional finishes, by and large, involve repeated coatings of synthetic resin bound pigmented emulsions followed by top coating with nitrocellulose lacquer emulsions. Footwear made out of these leathers are invariably given a final finish before they are transported to the show-room for sale.

Does the leather need all these expensive treatments one upon the other to have the desired optimum properties? Is there room for elimination of multiple coatings which load leather surface and change the original pleasing qualities of the feel and handle of the dyed crust? These are some points which caught the attention of leather technologists at Colour-Chem.

With the above concept as a starting point, they experimented to evolve a technique of finishing leather devoid of lacquer coatings, at the same time maintaining satisfactory dry and wet rub fastness, surface smoothness and feel; obviously reducing input costs substantially. These leathers, because of the absence of NC coatings, offer a more acceptable surface for final shoe finishing touch up.

Another advantage is that such systems also offer wide scope for development of adaptable procedures for various types of leathers including softy garments.

Principles and procedures involved

1. In contrast to conventional new finishing where surface coatings dry to form films, in the new technique the finish precipitates and gets embedded in the surface.

2. It is not necessary to have drying in between the coatings since the precipitation separates the water which sinks into the leather which is dried. The precipitation is made possible by intermediate sprays of formic acid. The precipitated films automatically become water resistant due to the acidity of the formic acid.

3. The wet precipitated coatings merge into a thick layer and dry out in the drying chamber.

4. The cross-section of the film will be acidic which helps improve the water resistance of the finished surface.

5. The thoroughly dried layers are given the desired grain/print and a heavy hot pressing consolidates the precipitated coating into the well anchored grain surface.

6. A top coating given by a combination of Vernamine Binder LH and Lustre C followed by a light spray of Varnamine Binder LB and hot plated at 50°C temperature.These leathers do not require any lacquering and exhibit satisfactory wet rub resistance, adhesion and feel.

Process Outline

1. ***Binder composition***

The binder composition may be made softer by increasing the proportion of Colour-Chem Binder UN and may be made harder by increasing the proportion of Vernamine Binder LH.

Binder Mix

Colour-Chem Binder UN: 150 parts
Vernamine Binder LH: 15 parts
Colour-Chem Lustre C: 120 parts.
This is to be stirred and kept as stock binder.

2. ***The recommended composition of pigments/binder are as follows:***

For uppers

a) Dermafine Black BL: 30-40 g/l
Binder Mix: 300-350 g/l
or
b) Vernasein Black R: 150-200 g/l
Binder Mix: 250-300 g/l

For Softies

a) Dermafine Black BL: 30-40 g/l
Binder Mix: 250-300 g/l
or
b) Vernasein Black R: 120-130 g/l
Binder Mix: 200-275 g/l

For garments

a) Dermafine Colours: 20-30 g/l
Binder-Mix: 250-275 g/l

Spray 2-3 coats of dilute formic acid intermittently. A special top coat may be given as follows:

Colour-Chem Lustre C: 1 part
Vernamine Binder LH: 1 part
Water: 6 parts
1 Cross spray/dry
Vernamine Binder LB: 1 part
Water: 3 parts
1 light spray/dry/plate at 50°C at 150-180/cm^2 pressure.

OVERHEAD OPEN CONVEYORS FOR HIDE AND SKIN TRANSPORTATION AND DRYING

In recent years the use of chain conveyors to transport pieces of leather ither horsed over or hung from poles r bars, has caught on considerably and is not just a fashion. Years ago these hains were virtually the only drying nethod for most tanneries and only ccasionally were they used as a complementary drying system. Nowadays ve are rediscovering them more and nore for the transport of hides and skins rom one point to another in the factory, promoting the standardisation of work n some stages of production.

To give an example, in some modern cow hide tanneries it is no longer a novelty to see vacuum dryers fed with hides arriving at the work station hung on bars from a chain conveyor, and after (vacuum) drying leaving by the same means, with the same operator unloading the chain, slicking out the leather and then reloading the chain.

At this point the skins or hides run overhead through the various production halls of the factory (they can also be transported between floors, up or down) receiving a natural drying at room temperature before reaching the next processing point, usually near wetting or conditioning machines. After stacking the leather can, for example, be conveyed to a through-feed toggling and drying operation and then to storage in the crust warehouse.

Besides the obvious practicality of transporting the leather, this system allows a reduction in the piling of leather on traditional horses, which is often the cause of mould growth which develops during weekends and holidays etc. Skins and hides hanging from or horsed on bars in the open air are always aired and always retain a certain degree of humidity, even if left for several weeks, as they are not affected by any direct heating sources.

In the planning of such overhead open conveyors certain factors play an important role. Firstly, drying of the leather taking into account the type of leather to be processed and the relevant production stage(s).

Leather drying

Generalising, we can say that goat and sheepskins are hung wet, after setting out, whilst cow hides are hung after sammying, vacuum and sometimes paste drying. The main problem is to obtain a certain and even production of dry leather every day, aside from the weather of the moment. Everybody knows that tanners in some countries must fundamentally fight the winter season and some others the rainy season when, among other things, the degree of humidity reaches very high levels. Every tanner must, of course, find the best solution to suit him. Some solve the problem by installing a chain with a higher capacity (especially where goat and sheepskins are being processed) so that the production from 2 or 3 days can be hung. This assures a certain number of dry skins every day, though this solution implies more space availability and a higher cost.

Others have solved the climatic problem by including some standard drying elements, forming a small tunnel on the chain. This is a more rational alternative adaptable everywhere. Such a small drying tunnel may be operated only when it is necessary; stopping it during the days of good weather; operating it just with the air ventilation system during days of uncertain weather; working it at full conditions (i.e. with the heaters on) when the weather is inclement. To have at one's disposal 24 hours instead of the traditional eight hour working day, and the fact that the leather faces a natural evaporation in the open air, allows the length of the tunnel to be minimised.

Chain composition

A tendency among tanners is to hang as many skins as possible per metre of chain but this is wrong. For the leather to dry naturally at room temperature air must be allowed to circulate between the pieces. Also, supposing that leather can be amassed, it has to be hooked and this in itself is quite dangerous and does not find favour with factory inspectors who have the power to shut the plant.

The bars of the chain must suit the leather to be treated: they must have a suitable length and shape and must be complete with clips, or with a special coating, generally PVC, which does not mark the leather and which augments the surface area of the bar itself allowing the air to circulate under the fold where the leather is hung. Skins are generally hung by clips whilst hides (sides or whole hides for upholstery) are normally horsed. Horsing, though faster than hanging, cannot be used for small skins which would drop off or for skins or hides which have to pass through a tunnel with forced air circulation inside. Clips with ceramic rollers are not suited to chains with sharp gradients.

If the chain is installed just for open air drying, then it is preferable to choose bars with the clamp in the middle to help counter-balance the weight. If the purpose of the plant is to feed a vacuum dryer or a throughfeed toggling and drying machine, a bar which allows the hanging of just one piece of leather is chosen to facilitate the operator. For goat and sheepskins longer bars should be opted which can be filled with as many skins as possible. However, long bars imply a wider radius of curvature for the chain.

Ventilation

The ventilation of the rooms where the chain runs is very important. Without adequate ventilation the atmosphere becomes unhealthy and the skins do not dry. It is obvious that if a chain bears, for instance, 1,000 pieces of leather per day coming from a vacuum dryer, and each one contains 1.5 kg of water (1,500 g or litres in total), the resulting humidity must not stagnate in the room but must be exhausted outside. The installation of humid air extractors could solve the problem unless a favourable climate allows doors and windows to be kept open all year round.

The final comment is concerned with

the motor driving the chain. It's speed should be adjusted electronically by programmers, not by mechanical variable-speed units, even though these are cheaper.

We hope we have been successful in explaining how a transport chain, which at first sight looks very simple (and mechanically speaking it is), involves quite a complex logic to obtain a satisfactory result and good efficiency. (*Leather*, 192 (4582) 1990).

'EASY CARE' TREND IN LEATHER PRODUCTION

One of the more noticeable trends in the industry today is the move to the production of 'easy care' leathers. This is evident in all segments of the industry although it is particularly prevalent in the clothing and sports footwear segments. The driving force behind this is consumer demand. Most products made from leather are still considered to be luxuries. This is not only because they are expensive to purchase but also because they are generally expensive to maintain. Normally leather garments require special care when being dry cleaned. The dry cleaning process requires some after treatment (usually a re-oiling) to restore the original character to the garment.

Due to the abundance of plastic 'imitation leather' products, it is no longer acceptable for high quality leather products to be heavily finished. The very naturalness of leather is one of its main attractions and consumers would like it to stay that way. Keeping leather natural means that a lot more aniline type leathers are being produced. The inherent drawbacks associated with the use of aniline type leathers are well known. Problems such as water spotting and soiling in wear restrict the utility of products and/or drastically increase maintenance costs.

Production of true 'easy care' leather has long been the goal of the industry. The major difference between earlier attempts and the current approach is the direction from which the task is being tackled. Previous attempts have focussed primarily on the finishing process; the main emphasis being on producing surface coatings that maintained integrity during extended periods of wear. Properties such as scuff resistance became prime targets for improvement. Also the ability of the surface coating to maintain its appearance with little or no attention, i.e. 'wipe clean' shoes, was considered desirable. However, it is in this realm that leather is at its weakest. Achieving these properties proved to be not too difficult but the resultant product ended up looking like an expensive version of its very imitators. One result of this was that leather went back to being leather. This was partly a result of changing consumer attitudes when natural products became more popular than processed goods. We have passed through the stage when simply being natural was an advantage, and the pendulum of consumer demand is swinging back again. The consumer now wants leather products that are both natural in appearance and possess good wearing and performance characteristics. Performance characteristics such as water repellency or waterproofness allied with light weight and ease of maintenance ('normal' dry cleaning and/or machine washability) are highly desirable.

This is where the change in approach takes effect. The 'easy care' leathers being produced today are more in line with other natural fabrics/fibres. Some years ago other natural fibres, such as wool and cotton, began to be treated to render them easy care. Today it is quite normal to machine wash, and even tumble dry, wool and cotton fabrics. Leather is a natural product that, like wool and cotton, would benefit from similar capabilities. Leather has lagged behind, however, because many of the treatments used to make other fabrics 'easy care' are inappropriate. Recent developments in the leather industry are beginning to change this.

The most notable, and successful, developments are taking place at the retanning/fatliquoring stage of leather processing. The majority of these developments have focussed on fatliquoring and fatliquors. Traditional fatliquors are easily extracted from the leather by solvent or water. Many of the synthetic oils available today are capable of binding to the leather making them less readily extracted. Chlorinated and sulphochlorinated oils are capable of linking to the collagen fibre in a reaction akin to that of tanning.

This reaction allows the production of very soft leathers with good resistance to dry cleaning. Similarly fatty esters are able to complex with the chrome already in the leather. The increasing use of fluorinated products is enabling the production of leather with dirt, grease and water repellency. One of the most radical developments in this field has been the recent introduction by Rohm & Haas Co. of a new class of acrylic syntan that possesses significant softening capabilities. The first of these products to be introduced to the industry, Lubritan WP, has been designed for the production of high performance waterproof leathers. In particular it is aimed at lightweight leathers suitable for the manufacture of garments and casual or sports shoes. It is a unique product with several application advantages over more common syntans.

Even though common syntans do provide support for the fibre structure, improving the leather's overall appearance, and are substantive they do not provide adequate softening but do generally provide adequate support for the basic structure. Lubricating acrylic syntans can, on lightweight leathers, simultaneously act as a synthetic retanning agent and a lubricant. At the same time they provide a high degree of water resistance. Leathers with a Maeser resistance in excess of 100,000 cycles and water absorption of less than 25% can be obtained relatively easily. Because they perform a dual role, products such as these can greatly simplify the retanning procedure. With all the developments it is likely that, the production of leather with true 'easy care' properties will become commonplace.

INDIAN LEATHER SCENE

UALITY LEATHER GOODS: ENTRE KEEN TO UPGRADE ECHNICAL INPUTS

The Government is exploring the ossibility of upgrading technical inputs the leather industry to give a boost the production of high quality fin- hed leather goods which form a sig- ificant part of India's commodity xports.

The Minister of Industry, Mr. Ajit ingh, said on August 22nd that the pri- ate sector, to which most of the leather rocessing and manufacturing units elong, would have to play a predom- ant role in building up trained man- ower to produce goods of international uality to cater to the needs of this eveloped countries.

Inaugurating UNDP seminar at New elhi on “The role of the private sector development of leather industry”, the inister said the phenomenal growth in eather exports in the last six years was argely due to the entrepreneurial abil- ty of the private sector.

He urged the private sector, UNDP nd concerned Government agencies to vork as a team to provide the skilled nanpower required in the leather sector. ‘I would strongly urge the private ector to take the initiative to set up nodernised tanning units with the latest tate-of-the-art machinery and equip- nent to reduce costs and improve qual- ty to the levels required to boost xports”, Mr. Singh said.

Lauding the achievements of the eather industry, Mr. Singh said the nnual rate of growth of 28 per cent during the Seventh Plan period was well bove the targeted growth rate of 19 per ent per annum. “During the same eriod, the value of exports rose even more impressively from a level of Rs. 662 crores to Rs. 2,030 crores in 1989-90. This has put leather and leather manufacturers fourth in rank amongst commodity exports from India”.

Despite allowing the import of leather machinery, chemicals and machinery under OGL, “It is disheartening to note that during the Seventh Plan period, the indigenous industry for manufacture of leather machineries and equipment, as also for leather chemicals and auxiliaries, has not developed at all”. he said.

“It is high time that the private sector came forward and geared up its activities to produce these items indigenously to minimise the outflow of foreign exchange”, the Minsiter added. Describing India as a “very small player in the world market for leather footwear”, Mr. Singh said Indian manufacturers would have to create and establish brand names for their products so that they could command a price on the global market.

One of the major handicaps faced by the small and cottage units which account for upto 90 per cent of the total production is that they do not have adequate expertise for marketing, the Industry Minister said. Lack of information about the type of products needed for exports, knowledge of colours, designs and product mix are the other hurdles small producers faced.

The Minister warned that unless the private sector acquires design skills and improves quality control to international levels, India would continue to produce items without originality or style. “The organised private sector shall have to play an important role by organising an efficient and effective market intelligence network to facilitate advance forecast of fashions and designs for subsequent seasons and organise the production accordingly”, he said.

Referring to the environmental problems created by the leather industry, which are one of the highly polluting industries, Mr. Singh said the Government is subsidising the installation of common effluent treatment plants for cluster of tanneries. At the same time, low-cost technologies for tackling pollution problems of the small-scale sector needs to be evolved, he added.

Earlier in his opening remarks, the UNDP resident representative in India, Mr. Erling Dessau, assured all assistance that UN body could render for upgradation of human resources and transfer of technology for development of the leather industry in India. He said UNDP's country programme for India envisages a comprehensive programme with components on leather processing, pollution control, improving leather quality, design, marketing and exports.

Mr. K.N. Ardhanareeswaran, Special Secretary in the Ministry of Commerce, who chaired the first session of the seminar, said the leather industry has moved to a position of pre-eminence with the phenomenal growth of leather exports. He told leather manufacturers and exporters participating in the seminar to phase out altogether the export of processed hides and semi-finished products and concentrate instead on export of more value-added items.

The Government has evolved a package of incentives for the development of the industry, including a liberal import policy for import of capital goods, components and consumer durables, he said.

The newly-established footwear design and development institute could play a vital role in improvising designs, fashion forecasting and chalking out innovative marketing strategies for Indian footwear makers to increase their share of the global market, Mr. Ardhanaeeswaran added.

LEATHER INDUSTRY ON THE DECLINE

The leather industry in Maharashtra was losing ground steadily, and its share in the country's total exports of leather products had dwindled to a staggering six per cent in the financial year 1989-90 from about 25 per cent a quarter century ago.

The Small Scale Leather Industries Federation (SSLIF) was formed about a year and a half back with the sole aim of restoring the leather industry in Maharasthra to its past glory, according to the president of the SSLIF, Mr, Prakash Mahtani. India had exported leather goods worth Rs. 450 crores in 1985, and the figure had risen to Rs. 2,030 in 1989. The share of other states was on the rise, while Maharashtra — the traditional leader in the trade — had lagged behind, Mr. Mahtani lamented.

He attributed this sorry state of affairs to the 'apathy and lethargic way of handling matters' by the state government and its officials. Proper treatment and encouragement in the form of a package of facilities from the government, so that the industry could produce value-added products and export them, would change the leather industry in Maharashtra for the better, he added.

Mr. Mahtani explained that the SSLIF was a unique industrial association, comprising raw material suppliers, tanners, main product manufacturers', ancillary product agents, besides manufacturers of machinery, components, fittings and other related material.

At the first annual general meeting of the federation held at Bombay in the presence of the Maharashtra finance and planning minister, Mr. Ramrao Adik, housing minister, Mr. Javed Khan, and the minister of state for industries, Mr. Shyam Ashtekar, Mr. Mahtani made several demands for the betterment of the small-scale leather industry in the state.

Mr. Subhash Chavan, one of the founding members of the SSLIF, said that the objective of the federation was to bring together all concerned on a common platform to look after the interests of small and medium scale leather industries, provide proper training conduct research to improve the quality and design of leather products and usher in modern technology in the leather industry.

The government response to his various suggestions for uplifting the leather industry in Maharashtra was encouraging, Mr. Mahtani said, adding that he had suggested at the AGM that a leather complex be set up at Bombay. This would provide better working conditions for the leather workers and the industry could be shifted from the Dharavi slums in north-central Bombay.

Another suggestion was to revitalise the government leather training school with well-trained master craftsman teachers, modern equipment and above all, a new curriculum to incorporate modern technology and modern trends in leather garments, footwear and other aricles.

Mr. Mahtani said he had also indicated to the ministers that the federation was ready to set up its own training centres for workers in the industry and others

A common effluent treatment plant, a large tannery restricted to tiny and small units only, a common service centre with the latest technology and modern equipment besides a research centre and human skills development centre including designers and pattern makers, at the leather complex was being contemplated, he added.

Mr. Ramrao Adik, who had once held the industries portfolio too, was readily agreeable to provide land near Bombay exclusively for a 'leather zone', or to reserve such zones at the MIDC estates. He also assured the SSLIF that training courses in leather goods manufacture at the government training institute would be revised and revamped to suit modern-day needs, according to Mr. Mahtani.

An entrepreneur and founder-member of the SSLIF, Mr. Bhimrao Katakdhond, elaborated on the difficulties faced by the industry in getting raw materials and government assistance in marketing. Even Mr. Adik had admitted that the Leather Industries Development Corporation of Maharashtra (LIDCOM) did not live upto expectations, he claimed.

FINISHED LEATHER EXPORTS ON OGL

The Government has decided to allow exports of all kinds of finished leather under the open general licence No. 3 of the import-export policy, volume II. A public notice issued by the Ministry of Commerce said that this shall be done subject to allocation and administration of quotas by the Council of Leather Exports, Madras.

The notice said that the move would encourage the manufacture of value-added leather products and shall come into effect from April 1, 1991. It further said that the exporters shall have to furnish details of the different categories of finished leather exported by them earlier in the form and manner as required by CLE, Madras.

It said that this information should be submitted to the Council before November 30, 1990 and failure to do this would disentitle the registered exporters from the allocation of the export quotas.

News from Abroad

IDDLE EAST CONFLICT WILL IT CHEMICAL INDUSTRY

Chemical companies are carefully honitoring the situation in the Middle ast following Iraq's invasion on Kuwait in August. There is much speclation over what impact it is going to ave on the industry.

The Chemical Industries Association CIA), based in London, says: "The mplications of the present situation are nany and varied", but believes it is too arly to gauge their full effects, as the rama continues to unfold.

'There will be some negative impacts on the industry, such as a tendency owards higher costs, lower profits and growth. But at the moment, with oil at round $26/barrel, this is generally seen s not being too disastrous albeit a 40% ncrease on average prices last year'. But it is inevitable that petrochemicals are going to suffer more than pharmaceuticals, which are further downstream and less exposed to oil prices, the CIA says.

The CIA expects that, in the short erm, the major cost determinant will be higher petrochemical feedstock costs, depending on how oil companies wish to pass on cost increases across their range of products. Naphtha prices have already responded and are expected to have an immediate impact on operating costs and margins at a time when demand for petrochemical products is weakening. But, the CIA argues, the extent to which this happens is dependent on the scale of the oil price rise and disruption of supplies, which are as yet unknown.

The CIA feels that if oil prices can be kept to $25-30/barrel, the overall effects are likely to be quite modest; if the situation gets any worse the world economy could be plunged into major ntime, the association is forecasting UK chemicals output growth of 1% for this year and 2.5% next year, saying, "When the dust settles, we shall review these numbers".

Meanwhile, there is a general feeling in the market that the chemicals industry is particularly vulnerable because of current low profitability and growth which have followed a period of extended buoyancy.

Heightened tension in the Middle East and political uncertainties looming over the market are also the key factors behind the rise in BP and Shell's share prices, said one London analyst. BP saw its shares rise from 325p ($6.07) to 367p; Shell's shares went up to 495p from 474p.

Commenting on how rising oil prices will affect petrochemicals operations, John Collins, chairman and ceo of Shell UK, said, 'Shell has been carrying out a number of "what if" studies', but added that it still too early to know how things would work out. He said he believed the oil embargo would have a rapid effect, while the effects of the Gulf crisis on downstream petrochemicals would be felt more slowly.

One immediate response is likely to be a shortlived sales boom as converters stock up in expectation of rising prices. If the conflict persists, said Collins, there would be a need to make harsh decisions on plant expansions.

A spokeswoman for BP Chemicals confirmed that it too was expecting stockbuilding of downstream petrochemical products to take place, as the perception in the market was one of rising prices. But she said that form past experience it takes around six weeks for an oil price rise to work through to downstream chemicals and polymers businesses.

Naphtha prices, however, have moved quickly in response to the crisis. One saving factor is that the invasion has taken place in the traditionally quiet period of August. This may delay price rises in polymers until the return of buying activity in September.

A spokesman for ICI said: 'The situation is not good news as it is going to have a major effect on raw materials, but as this is a holiday month in Europe, we will have to wait until September until we realise the full implications'.

ICI currently exports about £10m worth of goods, including pharmaceuticals, catalysts, agrochemicals and chemicals, to Kuwait and Iraq. Sanctions on exports to the two countries will not affect overall business as they are a small market, says ICI.

However, analysts at Barclays de Zoete Wedd say ICI is very exposed to cost pressures in its petrochemicals and plastics area.

Major European interests held by the Kuwait Investments Office (KIO) include a 9.9% stake in BP, 20% in Hoechst, 20% in Metallgesellschaft and 40% in Spain's Ercros. Most Western governments have frozen any assets held as a means of preventing Iraq from seizing them.

Both BP and Hoechst said this was not affecting business. BP has already paid its latest dividend totalling £21m to the US and UK banks holding the KIO's 9.9% stake.

BAVC REJECTS PAY CRITICISM

The West German Chemical Employers Association, BAVC, has rejected criticism that its new pay agreement for East Germany, which was negotiated with East German employers association and the two chemical workers unions, has inflated GDR salary levels. East German chemical workers now receive about 40% of West German pay levels, compared with 30% for East

Germany as a whole.

BAVC stressed the need to keep qualified workers from emigrating to the West and also to cancel a more wide-reaching rationalisation protection scheme passed by the East German government. This guaranteed three years' pay for dismissed employees and would mean economic ruin for the industry, the organisation said.

Recently, striking potash miners employed by the newly privatised East German company, Mitteldeutscher Kali, were considering whether to accept an agreement on shorter working hours and severance pay, negotiated by the GDR mine-workers union with the management of the formerly state-owned mines.

The agreement calls for workers on shorter hours to receive 68-85% of their normal net pay, as demanded by the union. But it does not encompass restructuring for the underdeveloped region, which would be severely affected by a closure of the mines. The workers had been on strike for more than a week.

ICI CUTS BACK

ICI is cutting back its intake of graduates this year. Market observers say this is a result of the drop in second-quarter pre-tax group profits and ICI's decision to sell its fertiliser facilitis in the UK.

The company is planning to recruit about 350 graduates this year, of which about three-quarters will enter scientific and engineering jobs, compared with about 400 people in 1989. However, ICI's education and recruitment manager, John Simpson said the decision to recruit less graduates was not because of market problems but because the company had taken on a larger than expected number of graduates in 1989.

Salary levels for graduates recruited this year are expected to be about 10% ahead of 1989 levels; graduates with first degrees will be paid between £2,100 ($22,000) and £14,300, compared to £11,000 to £13,000 last year.

ENIMONT SECURES LOAN, UPS DUNKIRK STAKE

Enimont has secured a $1bn loan, prompting a series of international agreements. But analysts are warning that the joint venture company is going to find itself even further in debt.

Following the signing of the loan last week, Enimont confirmed its plans to increase its share in Orkem's petrochemicals complex at Dunkirk to 70%, from its existing 50% holding. Atochem will hold the remaining 30% of the plant.

Enimont and Atochem have each subscribed a 10% share to Qapco, which is 80%-owned by the Qatar General Petroleum Corp. But both will contribute to the industrial and commercial management of the company. Qapco has a capacity of 280,000 tonne/year of ethylene and 140,000 tonne/year of PE. Enimont says its decision to sign the agreements reflects its decision to strengthen its international strategy.

The loan, which was signed by a number of international banks including Citibank and Credit Lyonnais, is structured as medium-term, revolving multi-currency facility and is available in either US dollars or any convertible Euro-currency. Enimont says a primary objective of the facility is to finance a part of its existing debt.

The group has also sold its 50% stake in Bellco to Snia. Sources say the sale, which marks the end of Enimont's joint venture in the haemodialysis industry with Snia, is part of its decision to rationalise its industrial portfolio and pay off its debts.

Terms were not disclosed. Enimont reported debts of around L6 trillion ($5.2Bn) at the end of 1989. There is a general feeling amongst analysts that Enimont is ignoring market conditions and continuing to expand through mergers or acquisitions despite its financial problems. One London-based analyst said: 'If we are going to see a reduction in Enimont's debt levels, it needs to look at some serious divestments'.

Meanwhile, following a directors meeting recently Enimont's managing director, Sergio Cragnotti has assured members that it is looking into the best possible industrial plan for the group.

Eni has apparently criticised the scheme for its generalised divestment policy, which is yet to be made public. Eni wants Enimont to maintain a fully integrated chemical cycle.

DU PONT KEEPS TIO$_2$ ON TIME

The economic restructuring of Du Pont's subsidiary in Brazil is not to affect the start-up of its $250m titanium dioxide (TiO$_2$) facility. The 60,000 tonne/year plant at Uberaba, Minas Gerais state, is part of the company's $450m investment programme scheduled for completion in 1995.

The Uberaba unit is to come onstream in two stages, the first of which will enable the company to complete the manufacturing process of 20,000 tonne/year of titanium dioxide imported from Mexico.

This stage is expected to go into operation by 1992 at a cost of $20m and is intended to meet rising domestic demand for pigments. Stage two involves the full start-up of the facility, scheduled for 1995. Costs are expected to amount to $200m, of which $27m will be used for environmental protection and $127m will be absorbed in equipping the plant.

According to Julio Barroso, the project's manager, the new schedule will not affect the current agreement be een Du Pont and the Brazillian export uthorities, allowing the company to nport $63m of equipment for the plant ithout facing import taxes. In xchange Du Pont guarantees exporting 220m worth of titanium dioxide begin-ing in 1995.

Meanwhile, the company is preparng to test 5,000 tonnes of TiO_2 raw naterial anatase concentrate to be suplied by the state-owned mining comany Companhia Vale do Rio Doce.

JK FINANCIERS BUY IG FARBEN SHARES

At least three prominent financial nstitutions in London have purchased ignificant shareholdings in I G Farben, he German company put into liquidaion after World War II.

The deal was put together by merhant bank N.M. Rothschild and stockrokers Smith New Court following heir discovery of the sale of a 20% lock of shares by a German investor. The two companies then found London-based buyers for it, among hem Mercury Assets Management, the nvestment management arm of City nerchant bank, S.G. Warburg. Mercury ourchased what is believed to be a 10% nolding on behalf of an unknown client.

Although the company was broken up by the Allies after the war and its nanufacturing assets distributed prinipally among what are now Bayer, BASF and Hoechst, complete liquidaion proved impossible due to the coniscation of the company's substantial concerns in East Germany. Shares in the company have jumped from under DM20 ($13) to DM30.

A&W INVESTIGATES

Albright & Wilson is currently invesigating a fire which took place at its Portishead, UK site where it stores 30 tonnes of phosphorus. A spokesman for the company said the group was looking into how the fire started and it is suspected that air may have entered into one of the sealed phosphorus containers.

Although there were no injuries, local police advised nearby residents to avoid contact with the fumes. Phosphorus burns spontaneously in air and is used in smoke flares for marine rescue. The company said there was no disruption to the running of its business.

BURMAH SELLS OIL TO PURSUE CHEMICALS

Burmah Castrol has sold its 29.7% shareholding in the independent UK oil company, Premier Consolidated Oilfields, bringing in net proceeds of £138m ($259.2m). The holding, valued in Burmah's accounts at £60m, was sold to Kleinwort Benson Securities, bringing in a net gain of £78m.

Burmah claimed the disposal is in accordance with its strategy of concentrating on the international marketing of specialised oil and chemical products. Proceeds from the sale will be applied to the company's investment programme which aims to expand its manufacturing, distribution and research and development facilities.

ICL CAUGHT OUT

Fertilisers and Chemicals, an affiliate company of Israel Chemicals (ICL), has found itself legally obliged to inform the Stock Exchange that it is violating the law due to the lack of a legal board of directors.

Nominations of new directors for state-owned companies must by law be ratified by the ministers of finance and of trade and industry. But sources in Isreal say since this has not taken place, the company finds itself in the position of breaking commercial law in the UK.

WAITING GAME

The 'Waiting Time', during which the merger between Genentech and Roche Holding is being reviewed by the US Federal Trade Commission (FTC), has been extended to 31 August, under mutual agreement between the companies and the FTC. In addition, both companies have certified that they are in 'substantial compliance' with the request for additional information, requested by the FTC under is antitrust powers.

Under the proposed agreement between Genentech shareholders and Roche, announced on February 2, Roche will invest $ 492m and pay Genentech shareholders $1.6bn.

WEST GERMAN FIRMS SPEED UP PLANS TO GDR VENTURES

West German chemicals groups are accelerating plans for investment in some of the newly privatised firms in East Germany. This follows the reorganisation of the Treuhandanstalt, the East Berlin-based agency responsible for privatising East Germany's formerly nationalised industries.

After BASF's announcement that it will take over the polyurethane manufacturer, SYS, Henkel has become the second chemical group to announce plans to take over a GDR production facility, namely the detergent manufacturer, Genthin. Hoechst, meanwhile, is eyeing a joint venture in manmade fibres with Chemiefaserwerk Guben.

Henkel has confirmed that it has been negotiating with the Treuhandanstalt about acquiring full control of its East German former subsidiary, Waschmittelwerk Genthin, and has said it will invest DM60m ($38m) in upgrading production there.

Around DM5m has already been spent on establishing a marketing structure for East Germany, redesigning packaging and reformulating the product since the two companies established a joint venture earlier this year.

Plans for cooperation or a joint venture with the liquid detergent and cleansers producer, Dolmai-Werke, in Stadtilm, East Germany, are also being studied by Henkel. But these talks are at a very early stage, the company says. Henkel is aiming for annual sales in East Germany of around DM250m. Meanwhile, sources say Hoechst seems to have found its base in the East German manmade fibres market. Hoechst is said to have signed a letter of intent with East German fibremaker, Chemiefaser Guben, formerly part of the GDR combine at Schwarza, to set up a joint venture, in which the West German company would control the majority. The joint venture would incorporate about half of Guben's current 65,000 tonne/year capacity to produce polyamide and polyester fibres.

In addition, Hoechst and Guben will explore using the site for a European launch of polyester tyre cord production with technology owned by the West Germany group's US subsidiary, Hoechst Celanese. The US subsidiary controls well over half of the US market for the high-speed tyre reinforcement fibre and more than a third of the world market. Guben has the capability to produce 8,200 tonne/year of polyamide-6 tyre cord and this can be expanded by 50%.

Until the joint venture is in place around year-end, Hoechst, and Guben will regulate their cooperation through individual contracts covering modernisation of production technology transfer, contract production of Hoechst's textile and technical yarns and the exclusive marketing of these products.

The Treuhandanstalt is seeking buyers for 8,000 formerly state-owned firms, employing nine million people. Functioning as an investment bank and as an intermediary, it has the authority to decide on the terms for the sell-off of formerly nationalised industries and is responsible for attracting potential investors. Questions still to be settled by the agency include pollution at production sites, ownership of the property and export conditions.

SHIPPING JV

Genchem and Netherlands shipowner Gebr Broere are currently negotiating a joint venture to take over shipping agency Clarkson Brothers & Casper. Although the deal is not yet finalised, a target date of September 1, has been set for its completion. The London-based firm sees it as a logical step.

Among the facilities covered in the deal is ICI's terminal on the Tees, one of Europe's major chemical ports through which 1m tonne/year of chemical products are said to pass. Broere, which owns and operates chemical storage facilities and a fleet of chemical tankers in the North Sea, already has a shipping contract with ICI.

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Chemical Markets Abroad

OIL SHOCK FEEDS THROUGH PETROCHEMICAL MARKETS

Petrochemical producers have been hit hard by soaring naphtha feedstock prices, on the back of the crude oil supply shock generated by the Iraqi invasion of Kuwait. Crude, and consequently naphtha numbers had been rising since the last Opec meeting, on 25th July, showing clearly how the cartel's hardliners were prevailing over Kuwait and the United Arab Emirates.

These countries had been exceeding production quotas and were reluctant to set a high target price. Iraqi demands for a $25/barrel target had given rise to a $21/barrel compromise, and to undertakings to produce within the set quota restrictions. By August 1, prompt naphtha was firming at $170/tonne cif NWE.

With an international oil trade embargo on Iraq and occupied Kuwait now being enforced, over 4.5m barrel/-day have been taken out of the world market. The success of the effort to isolate Iraqi-controlled production was still in the balance, with pipeline transport facilities still partly in operation across Saudi Arabia, and Opec likely to replace lost production.

"The most alarming thing is that the idea of long-lasting crisis is consolidating', commented a European petrochemical feedstock manager. 'As the foreseen time-scale of a crude shortage lengthens, the uncertainty increases and crude oil consumers spread out their dwindling stocks over an ever-increasing interval.

Brent crude quotations for September were at $25/barrel on August 8. Jack Helfenstein, executive vice president of Dow Europe, feels that a US-Iraqi confrontation is likely to last some 6-8 months, with an accompanying disruption in crude oil supply and prices remaining high throughout the period. This would suggest that a crude price of $25/barrel could be sustained.

The feeling of one feedstock supply operator is that: 'If this crisis had not arisen we would have gone to $16-17/barrel. If the crisis is quickly resolved, once the market regains some confidence the underlying high stocks with consumers, resulting from Opec's recent overproduction, will take over. In the event of a prolonged supply shock, however, consumers may be reluctant to leave inventories run down and the effect on prices would be more lasting'.

The jump in crude numbers comes despite the currently high stock levels with consumers. Prices averaging around $18/barrel through part of 1990 had prompted buyers to build inventories, as the floor to numbers for the year was felt to have been reached. Statistics for US crude oil stocks show a 386m barrel/day level for 27 July against 330m barrel/day a year ago.

Naphtha numbers have followed crude swiftly. Having jumped to $230/tonne cif NWE August 6, they had reached and overtaken $260/tonne cif NWE on August 7, a gain on some $100/tonne on prices a week before. The escalation in numbers is reflected in each single parcel: 'Naphtha contract prices are based on screen quotations, and these dictate our contract purchase prices', confirmed a buyer. 'Paper' (forward) quotations are currently the object of much uncertainty, and players are thus less willing to enter the market.

The effects of the crude shock had reached the aromatics market by August 7. After a day of thin trading on August 6, the perception of a worsening situation in the Gulf had lead the following day to a surge in demand for octane components. Toluene was quoted at $410-440/tonne fob NWE; benzene was reported to have been exchanged at $485/tonne.

Cracker operators' concerns now centre on passing on the price effect to the olefins market. European Q3 settlements remain deadlocked, and contract supplies are at DM835/tonne FD ($530/tonne). With naphtha levels soaring, cracker economics are rapidly deteriorating. An ethylene purchaser argues that, 'in 1986, when naphtha numbers plunged, ethylene did not follow until three months later. We could now see ethylene show the same lag in adjusting upwards'. Olefin producers, he stresses, have enjoyed very attractive returns in April-July.

The tightness of the ethylene and propylene markets, brought about by serious unforseen production shortfalls in Q2, is currently the saving grace for cracker operators: ethylene spot numbers remain high, although propylene is gradually softening.

The market is expected to retain an underlying firmness through to the autumn, and significantly four producers are reported to have postponed to 1991 their plant turnarounds originally scheduled for September/October.

With August monthly ethylene contracts at DM870/tonne FD, producers' efforts at securing an increase in the quarterly price above some DM30/tonne have not as yet been successful. Unlike aromatics, which are affected more directly by oil price fluctuations (via gasoline blending), olefins prices are thought by some players to be decoupled in the short run.

In the current situation, the expectation of prices rising further should prompt producers of polymers and intermediates to increase the buildup of stocks. This would allow the downstream transmission of a price increase even higher than the naphtha hike. It is argued, however, that PE, PVC and (if copolymer grade production is taken into account) PP makers are running at near capacity, limiting this

The fall in share prices for the non-oil-integrated chemical producers is in obvious contrast to buoyant quotations for the oil majors.

An operator at a major non-oil-integrated chemical company conceded that falling shares reflected, in part, the concern of investors as to how his group's business would fare under higher cost conditions.

There is uncertainty among market players as to whether chemical groups will suffer especially, as they endeavour to pass on the feedstock cost hike, or whether they are seen as key indicators of business performance in the light of surging energy costs.

An analyst noted that, 'the first impact on shares was a knee-jerk reactión, with the share price swinging simply according to whether a company buys or sells oil. Attention will now focus on how the company will perform in the slowdown'.

TIGHTENING IN PROSPECT FOR WORLD METHANOL MARKET

The Global methanol market is to see a gradual tightening over the next three years, attaining an average utilisation rate of around 91%. A recent study by the consultancy, Crocco & Associates, envisages methanol demand growth clearly outstripping capacity increases, whereby existing spare capacity will be considerably eroded.

On the supply side, only one grass-roots worldscale plant is under construction (Saudi Methanol's 560,000 tonne/year plant at Al Jubail), and its impact is not expected by Crocco to be felt until 1992.

Aside from the eventual commissioning of a limited number of methanol units in the US, a major additon to world capacity is shortly to come onstream when Petrocorp starts up its new 450,000 tonne/year Petralgas crude methanol distillation facility at Waitara, New Zealand.

The impact of Petrocorp's new production, which will compound the company's current 550,000 tonne/year output, will make itself gradually felt over a period of several months. Export markets will be mainly in the Far East, but also in the US and in Europe.

Crocco & Associates envisages a global 12% increase in methanol capacity, amounting to 2.7m tonne/year. Against this, demand is forecast to register a global increase of 4.1m tonne/-year, equivalent to 23% growth.

Gasoline reformulation in the US, and lead content phasedown in several other markets mean that MTBE will be the main source of demand.

Consultant James Crocco notes, however, that this will not by itself necessarily translate into better margins for merchant methanol producers.

Downstream applications for methanol face widely different costs; MTBE producers are, in principle, able to pay a higher feedstock price than is the case for the formaldehyde sector.

Yet the structure of the methanol producers' market is highly competitive, determining single bulk commodity market price for the product.

The high-volume methanol buyers in the MTBE industry will only gradually be forced to come to terms with higher feedstock prices, in the measure that methanol utilisation rates increase through to the mid 1990s, Crocco believes.

The current low rates of return for methanol plant investments will thus bring about a correction. A further factor is the element of political risk affecting investment in the key methanol producing regions, as has been the case in the past months for Venezuela, Trinidad, and the Arab Gulf.

ACRYLONITRILE SET FOR GLOBAL GROWTH

World demand for acrylonitrile will grow by 3.7%/year in the period 1989-95, according to consultant CMAI. However, the growth rate for acrylic fibre, which currently accounts for 63% of world demand, will lag at 2.7%/year, while ABS/SAN reaches 6.2%/year.

Adiponitrile will show the strongest increase, with a projected annual growth of 6.7%. ADN growth will be due largely to expanding capacity in the US, Western Europe and Japan, based to a great extent on growth of the nylon-66 market.

Between 1985 and 1989, Western European demand slipped from 825,000 tonne/year to 650,000 tonne/year. This was entirely due to falling demand from the acrylic fibre industry. This is expected to recover to some 800,000 tonne/year by 1992, but from then it will decline again, reflecting the fashion-led nature of demand.

Total US demand is projected to grow by 2.6%/year, including exports, with acrylic fibre demand slipping at the rate of 0.7%/year in the years to 1995.

IMO TYPE 1 LAUNCH

Lindenau has announced the launching of newbuilding S234, a tanker ordered by Carl Buttner of Bremen. The 23,000 dwt tanker is of IMO Type 1 with ice class E3. The vessel has a double bottom and side shell and its centre tanks are suitable for IMO class 1 chemicals.

The centre tanks give S234 class notation Coll 5, the highest notation ever awarded by Germanischer Lloyd.

The ship is to be delivered by 31 March 1991.

News From Japan

OITA ETHYLENE PROJECT TO BE RAPIDLY PROMOTED

With Showa Denko K.K. playing a leading role, a new enlargement project, for the No.3 ethylene plant at the Oita petrochemical complex is going to proceed rapidly. Following the inroads made into the complex by Nippon Shokubai Kagaku Kogyo Co. Ltd., a major manufacturer in the Kawasaki petrochemical complex, has also revealed its intention to move into the Oita complex.

Tonen made the decision as part of its long-range strategy. President S. Muramatsu of Tonen Petrochemical said: "Oita is most suitable in view of relationships with the Ace Polymer joint sales group for polyolefin." It can be said that in addition to the existing manufacturers in the Otia complex, a 3-company consolidation of Showa Denko, Tonen and Nippon Shokubai has almost been established in the Oita area. The No.3 ethylene plant enlargement project aimed at 1995 has actually got underway. It can be said that along with the Kashima group of Mitsubishi Petrochemical Co., and Mitsubishi Chemical Industry Co., as well as the Chiba group of Maruzen Petrochemical, Sumitomo Chemical Industry and Mitsui Petrochemical, the firms in the Oita project are rapidly becoming a group.

The most important points in working out the new enlargement project centering on Showa Denko in the Oita petrochemical complex were how to lure major petrochemical manufacturers and how to strengthen the induction-product division. First, in March this year, Nippon Shokubai Kagaku Kogyo Co. Ltd., a major manufacturer of EO/EG, acrylic acid and acrylic acid ester, made inroads into the Oita complex. Showa Denko and Nippon Shokubai are also planning to start a joint project soon in order to finalize a new enlargement plan and to begin negotiations with the Oita Prefectural government.

Tonen Petrochemical, following Nippon Shokubai, has clarified its intention to move into the Oita complex. Tonen has formed a petrochemical complex in the Kawasaki area and is planning to expand the ethylene plant there to 500,000 tons towards the end of this year. However, shortages of ethylene and olefins seem unavoidable in the medium or long-term. Accordingly, it is imperative to secure a new olefin source in order to expand the derivative business.

Furthermore, in light of the Kawasaki area's future, including environmental problems and rising land prices, switching to higher-value-added products has become unavoidable.

Under these circumstances, Tonen has worked out a long-range policy of strenthening the foundation of its general-purpose-petrochemicals division by expanding into the new location.

Showa Denko and Tonen Petrochemical have formed a joint sales group for polyolefin — "Ace Polymer" — and have been maintaining a close relationship by exchanging their products, such as polypropylene and high-density polyethylene (HDPE). Showa Denko and Tonen are also studying a joint plan for future enlargement of polyolefin capacity.

NITTO TO PRODUCE ABROAD MICROBE FOR MANUFACTURE OF ACRYLAMIDE

Nitto Chemical Industry Co. has commenced feasibility studies on deployment of its acrylamide operations abroad as it is now close to success in commercial application of its new, powerful 3rd-generation microbial catalyst. Acrylamide is used in coagulators, soil conditioners for paper treatment and paper sizing, and for adhesives and paints.

The new microbe — **Rhodococcus rhodochrous** strain J1 — developed by Nitto Chemical is said to be ten times as efficient as the 2nd-generation microbe. **Pseudomonas chlororaphis** strain B23, used as a microbial catalyst in Nitto's 6,000-t/y acrylamide plant at its Yokohama factory. The company is now preparing to expand by the end of next spring the 6,000-t/y capacity to 20,000 t/y utilizing the new microbe.

Nitto received many inquiries from Western acrylamide and coagulator makers regarding use of the 2nd-generation microbe but suspended negotiations with them as it was tackling commercial development of the newer, far more efficient microbe. Now that it is close to success in its application, it has begun to talk with Western businesses on joint ventures overseas.

The Japanese firm is considering constructing production facilities for the microbe in the U.S. and Europe when the amount of the microbe required by Western firms comes to a certain level. Nitto then plans to supply the microbe from its local facilities to Western companies.

CONSTRUCTION OF ETHYLENE PLANT KICKED OFF: M'BISHI

Mitsubishi Petrochemical Co., begun on July 27 to build a 300,000-t/y ethylene plant at its Kashima factory. It will be accompanied by new production facilities for polyethylene (80,000 t/y), polypropylene (80,000 t/y), ethylene oxide (110,000 t/y) and ethylene glycol (100,000 t/y). They will be put into commercial operation in mid-1992. Thanks to the advantageous location of the plant site concerned, the company leads other domestic petrochemical producers who are also moving toward building new ethylene plants amidst a global boom in the ethylene business.

The process using a microbial catalyst for acrylamide production has the following advantages compared with conventional ones using copper as catalyst: (1) higher reactivity and selectivity producing high-quality product with few by-produced impurities; and (2) no concentration process is required and 50%-pure product is obtained. In addition, while conventional methods need a large capacity of around 20,000 t/y for commercial production, the microbial process makes a several-thousand-ton-per year capacity commercially viable.

KANEGAFUCHI LINKS WITH ICI FOR SALES OF VC REINFORCING AGENT, PROCESSING AID

Kanegafuchi Chemical Industry Co. has announced that it has established a package system with ICI of the U.K., under which products of both companies will be supplied, including a vinyl-chloride additive manufactured and sold by Kanegafuchi.

The vinyl-chloride reinforcing agent — "Kane Ace B" MBS resin — manufactured and sold by Kanegafuchi Chemical's subsidiary, Kaneda Belgium, and the acrylic-vinyl-chloride processing aid — "Diacon APA" — of ICI will be supplied in a package by the two companies to their users.

The sales tie-up between Kanegafuchi and ICI will substantially strengthen their sales systems, because both companies will be able to offer products which they could not in the past. The contract concerned will be valid for two years, but Kanegafuchi and ICI want to develop the sales tie-up into a wider partnership including technology exchange in future. The sales tie-up will be an important foundation from which to develop various businesses on a global scale.

In 1973 Kanegafuchi Chemical Industry started local production of MBS resin in Belgium in order to sell it all over Europe, the mid-East and Africa. Kanegafuchi holds a share of approximately 50% in the vinyl-chloride reinforcing-agent market.

On the other hand, ICI is one of the leading European manufacturers of MMA monomer as well as of a wide range of acrylic resins and their plastic products. ICI also ranks second in air field. ICI's subsidiary — EVC Inc. (owned 50% by ICI and 50% by Enimont; head office in Brussels) — is the world's largest vinyl-chloride manufacturer.

As a result of this co-operative effort, Kanegafuchi is expected to greatly increase its share of the MBS resin supply to not only EVC Inc. but also other ICI-controlled users. On the other hand, ICI Inc., which is promoting acrylic business, will also be able to carry out package sales of MBS resin in the acrylic-vinyl-chloride processing-aid field. As a result, both companies will be able to cover their weak points and promote their market development policies more positively.

SUMITOMO TO SWITCH ITS DYES FROM POWDER TO GRANULE FORM

Sumitomo Chemical Co. envisages switching of all its reactive/disperse dyes from powder to granule form, within this year. Granulated products will help improve working conditions on the part of users and automate application processes. To this end, the company has developed a special spray-drying process and granulation technique.

To date almost all synthetic dyes have been of powder type having micron-order particle size. They have high purity but create a dusty environment when put into practical use. It is, therefore, urgently required that they are switched to nonpowder form. Disperse dyes have come to be shifted to liquid type and it is forecast that liquid-type reactive dyes will be commercialized immediately. The company already installed equipment for liquifying reactive dyes. Granular dyes have an advantage over liquid ones in that they are suitable for transportation over long distances and small-lot-and-wide-variety production.

Almost all reactive/disperse dyes exported from Japan will be of granule type, though powder products will continue to be used in Japan to a certain degree.

TORAY INDUSTRIES TO START NYLON-RESIN MASS PRODUCTION

Toray Industries has established systems for mass production of nylon resin in succession. The company has carried out expansion of its facilities for production of nylon 66 resin, while it has started to expand production of Nylon 6 resin. These facilities will go into full-scale operation in the near future. These kinds of nylon resins have their production bases at the Nagoya plant (Aichi Prefecture). The amount of investment is about ¥3 billion. This means that Toray Industries has established a system for the annual production of 50,000 tons of Nylon 6 and Nylon 66.

Toray Industries, like Asahi Chemical Industry and Ube Industries, is one of the major suppliers of nylon resin. It provides a diversified nylon family including Nylon 6, Nylon 66, Nylon 11, and Nylon 12. It maintains an integrated process of production for Nylon 6 beginning with raw-material caprolactam.

The facilities for Nylon 6 production, which were expanded by 9,000 t/y, went into operation at the start of this year. As a result, the total Nylon 6 production capacity increased to 28,000 t/y. It was decided to expand the supply capacity in order to meet the increasing demand.

On the other hand, the annual Nylon production capacity has been boosted 8,000 tons recently. As a result, a stem has been established for the nual production of 22,000 tons. This eans that Toray Industries has brought Nylon 66 production capacity close the level of Asahi Chemical Indus- which is the biggest manufacturer of lon 66 (25,000 t/y). At present the w facilities are in test operation, and e company will switch to the panded production system by this mmer.

Also, the expansion of facilities for mpound (materials before molding), hich was pushed parallel with the pansion of Nylon 66 production facil- es, has been completed. Compound is ipped mostly in the process of addi- n of stabilizers, colorants, supplement d reinforcement for adaptation of sin to molding. Nylon resin and other nds of engineering plastics are mostly ipped in the form of compound. The ason is that there are many customer ades corresponding to user needs.

Toray Industries has decided to use lybutylene terephthalic (PBT) resin, well as nylon resin, for compound cilities. This will accelerate the deve- pment and marketing of high-function ades. In terms of volume, nylon resin s the lion's share among the five ajor general-purpose engineering plas- cs. Demand for this kind of resin is creasing mainly among the manufac- rers of automobile parts, parts of usehold electrical applicances, and m.

APROLACTAM PRODUCTION ECOVERING

It has become likely that the output caprolactam, a nylon material, in 90 will reach the 490,000-ton level, 20, to 30,000 tons more than that in e preceding year. The reason is that ports are brisk, while shipments to lon fiber and resin enterprises at home e increasing. There is the possibility that production in 1990 will exceed the highest annual level of 493,000 tons reçorded in 1988.

According to the Ministry of International Trade and Industry's monthly report on chemical-industry statistics, the output of caprolactam in the January-April period of 1990 amounted to 156,700 tons, an increase of 4.9% in comparison with the corresponding period of the previous year.

Demand is increasing in almost all fields. At home, production of nylon long fiber, which is used for pantystockings and other clothing items, is brisk. Also, products for nontextile uses, such as nylon resin and film, are growing steadily. The main factor behind the rapid expansion of demand is that export items, which remained stagnant in the first half of last year, have now recovered.

The major destination is Southeast Asia including ROK and Taiwan. Demand for nylon long fiber is increasing in such places as Tafta and Oxford. To meet the demand, plans have been started in succession for the expansion of nylon-fiber production. The annual increase in demand from last year thru this amounts to about 70,000 tons. On the other hand, demand is increasing in China as well, helped by the relaxation of loan controls. Earnest inquiries have been sent to Japan, but the Japanese side is unable to adequately cope with the inquiries because of shortage of goods.

Last year caprolactam output fell to 468,700 tons, or about 25,000 tons less than that in the preceding year, because exports decreased sharply due to strikes by ROK workers demanding wage increase and the growth of political unrest in China.

It is certain that production this year will recover to the level of the year before last. Indeed, there is a possibility that this year will see the renewal of the production record

DEMAND ESTIMATE FOR PAN-TYPE CARBON FIBER REVISED DOWNWARD

Toray Industries, Inc., has announced its projections for world demand for PAN-type carbon fiber covering up to 1995. It is expected to have amounted to 5,800 tons, in 1989 up 5.2% over the preceding year, on the assumption that U.S. demand declined in the wake of cuts in the country's military spending.

The company has forecast that world demand will increase annually by 8.9% on average until 1995 and reach 9,500 tons in 1995.

In projections it attempted in February, 1989, it expected the demand to touch the 10,000-ton level in 1995.

World Demand for PAN-type Carbon Fiber (in tons)

	1989	1990	1995
U.S.	2,500	2,630	4,060
Europe	1,100	1,250	2,200
Far East others	1,090	1,140	1,600
Japan	1,100	1,170	1,650
Total	5,800	6,190	9,510

SALT PRODUCTION PROCESS DEVELOPED: TOKUYAMA SODA

Touyama Soda Co. has developed a new ion-exchange membrane process for salt production: the process combines an upgraded ion-exchange membrane with improved pretreatment/production methods. The new process has excellent ionic selectivity and is capable of raising the salt content in brackish water by more than ten percent and maintaining this performance for more than four years. The company claims it is of electric power-saving type and aims to promote its sales in Middle East and Southeast Asia in cooperation with domestic engineering firms.

New Developments From Japan

POLYPLASTICS TO MASS-PRODUCE LONG-FIBER-REINFORCED PLASTIC

Polyplastics Co. is scheduled to build this September a 1,000-t/y compounding plant for "Celstran" thermoplastic molding material at its Fuji factory in Shizuoka Prefecture.

The product is reinforced with staple (length: approx. 10mm) and, as a result, has high-level shock resistance rigidity, workability and fatigue/creep resistance. It was developed by PCT (U.S.), which was previously taken over by Hoechst Celanese. Polyplastics is jointly owned by Hoechst Celanese and Daicel Chemical Industries.

Polyplastics has imported the product since the spring of 1988. It has been applied to parts for automotive engines and industrial-use products including large-sized moldings.

The company installed last year a semicommercial plant for the promising molding material at the same factory. It is forecast that demand for long fiber-reinforced thermoplastic resins including Celstran may markedly expand in a few years, keeping pace with moves toward further reducing car weight toughening automobiles.

MITI'S 10-YEARS CO_2 FIXATION PROJECT UNDER WAY

This year MITI has started a carbon-dioxide-fixation-technology project which makes use of contact hydrogenation reaction. The project is aimed at developing technology for recovering carbon dioxide directly from plants, power stations and other sources of carbon dioxide and reusing the recovered carbon dioxide as a resource (methanol, etc.) by using catalysts and other chemical reactions.

This would contribute to solving the problem of global warming (greenhouse effect), which results from the increase in the density of carbon dioxide in the atmosphere, one of the earth's major environmental problems.

The R&D will be carried out mainly by the National Chemical Laboratory for Industry, the National Research Institute for Pollution and Resources and the Government Industrial Research Institute, Osaka. The Earth Environment Industry Technology Research Industry (tentative name), which is a foundation conceived to control the above-mentioned research institutes, will be established this summer. Full scale activities will start in 1991.

The Earth Environment Industry Technology Research Institute will be built in Kansai Science City in the Keihan district which includes Osaka and Kyoto Prefectures. The construction work will be completed in April, 1992. Development members are now being selected from among industrialists, government officials and scholars. The selection will be finished by the time of the establishment of the foundation this year.

Recently, the density of the carbon dioxide in the atmosphere has gradually been increasing as a result of massive consumption of petrochemical fuel, thus causing one of earth's environmental problem.

To cope with this, a system is now being studied to recover the massive amounts of CO_2 which is generated from plants and other fixed generating sources, directly by using separation film, etc., to convert CO_2 into useful chemical materials by means of chemical reaction, and to reuse the CO_2 as a resource.

Using this system, it is possible to treat large quantities of CO_2 by further improving and developing those technologies which have already been established to a certain extent. However, i is necessary to develop basic technology for each process and to complet an energy-saving and highly effectiv total system.

The outline of this R&D is: (1 develop a separation film excellent i selection and permeation of CO_2 a well as in durability and heat-resistan property, (2) to develop a catalyst excellent in CO_2 inversion and selectio rates (target — 50%), (3) to develop method of manfacturing — effectivel and at low "environmental load' —hydrogen to be added to CO_2 an (4) to develop a system that is highl effective and energy saving from recovery to reuse of CO_2.

In connection with the developmen of the process, the National Chemica Laboratory for industry will be in charg of development of the CO_2 permeatio film; the National Research Institute fo Pollution and Resources will be i charge of the development of catalys and the Government Industrial Researc Institute, Osaka will be in charge c hydrogen manufacture.

The Earth Environment Industr Technology Research Institute wi engage in the development of the tota system and the control of the projec

This project will last for ten years. I the first five years various technologie including these for CO_2 hydrogenatic catalyst and highly effective hydroge manufacturing method, will be deve oped and evaluated. In the last fiv years, various technologies will t scaled up, test operation will be carric out at a bench plant and a demonstr tion plant, and supporting studies w be conducted.

The budget for the project will t ¥580 million in the first year and abo ¥600-700 million yearly from tl second year on — with a maximum ¥1 billion per year. The budget for t ten years will total ¥10 billion.

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MARKET INFORMATION

Low activity in chemicals, dyes intermediates up

Shortage of basic chemicals has reduced activities in the market. Phenol, acetone, phthalic anhydride prices have pushed up.

In the dyes intermediates section increase in input costs has pushed up the price of almost all the intermediates.

We cannot guarantee the accuracy the prices published in CHEMICA WEEKLY as they are based only on th enquiries made by our correspondent and, as such they are not FIRM PRICE as between a buyer and seller. Th prices are published only with a view giving some ideas of the market cond tions.

The prices are inclusive of Excise ar Maharashtra Sales Tax.

(Prices as on September 18, 1990)

INDUSTRIAL CHEMICALS	Per Kg.
Ammonium sulphate	2.50
Ammonium phosphate (Mono)	14.50
Ammonium phosphate (Di)	14.50
Ammonium carbonate (Di)	17.00
Ammonium bicarbonate	6.00
Ammonium chloride	3.25
Ammonium nitrate	6.00
Arsenic white powder	22+ST
Acrylamide (Resale)	85.00
Barium carbonate	20.00
Bleaching powder (33% Cl)	5.00
Borax (Granular)	16.00
Borax (Powder)	22.00
Boric acid (Tech)	32.00
Bisphenol-A	75.00
Butyl carbitol	106.00
Caustic soda (Flakes)	11.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	10.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	6.00
Calcium carbonate (Activated)	5.75
Cobalt oxide	550
Cresylic acid	62
Camphor (Indian)	105
Cream of Tartar (Tech.) China	70
Citric acid (Belgium) (Resale)	47
Citric acid (Indian) (Resale)	41
Copper sulphate	24
Chromic acid	63
Ethylene urea	58
Ferric chloride (Lumps)	9
Ferric chloride (Anhydrous)	20
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Glue sheets	6
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ssium carbonate (Imported)	32.00
ssium bichromate	38.00
ssium phosphate (Mono)	34.00
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vinyl alcohol (No. 208)	170.00
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golite (Czech.)	72.00
golite (China)	53.00
ium sulphate (Fine)	3.75
ium sulphate (Coarse)	3.50
ium sulphide 50-52% Flakes)	11.50+ST

Sodium sulphide 58-60% (Flakes) (TCL)	25.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	1,300.00
Sodium chlorite 80% (Spain)	100+ST
Soda Ash (Tata)	5.00
Soda Ash (Birla)	5.00
Soda Ash (Imp.)	5.00
Sodium bicarbonate	7.00
Sodium bisulphite	8.00
Sodium silicate	5.50
Sodium acetate	7.20
Sodium alginate	450.00
Titanium Dioxide (Anatase)	65.00
Titanium Dioxide (Rutile – RCR$_2$)	88+ST
Tartaric acid	190.00
Trisodium phosphate	12.00
Thiourea	78.00
Urea (Tech.)	3.00
Vacuum salt	1.00
Zinc Dust	52.00
Zinc Oxide	58.00
Zinc chloride powder (Tech.)	20.50
Zinc sulphate	7.00

SOLVENTS	Per Kg.
Acetic Acid Glacial (Resale)	14.50
Acetic Anhydride (Resale)	35.00
Acetone (Resale)	24.00
Adipic Acid	90.00
Aceto Acetanilide	50.00
Aniline Oil (HOC)	48.00
Benzoate Plasticiser	62.00
Butyl Acrylate	85.00
Butyl stearate	38.00
Butanol	34.00
Benzyl Alcohol	60.00
Benzyl Chloride	34.00
Benzo trichloride	16.00
Benzoyl chloride	22.00
Bromine Liquid	68.00
Chloroform	30.00
Carbon Tetrachloride	20.00
Cellosolve	65.00
Cyclohexanone	64.00
Cyclohexanol	58+ST
Diacetone (Resale)	26.75
Diethyl Oxalate	34.00
Diethyl glycol (DEG) (Resale)	38.00
Dioctyl Phthalate	45.00
Diallyl Phthalate	42.00
Dimethyl Phthalate	28.00
Dioctyl Adipate	52.00
Dibutyl Adipate	42.00
Dipentene	15.00
Dimethylamine 40%	30.00
Dimethylamine 50%	35.00
Ethyl Acetate	22.50
Ethyl Acrylate	66.00
Ethylene Dichloride	18.50
Ethylene Glycol	35.00
Formic Acid (Imp.)	24.00
Formaldehyde (Resale)	6.50
Glycerine (CP)	48.00
Glycerine (IW)	55.00
Hydrogen Peroxide 50% (Resale)	39.00
Isopropyl Alcohol	40.00
Isobutyl Alcohol (Resale)	35.00
Monoethanolamine (Resale)	105.00
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Methyl Isobutyl Ketone	38.00
Methyl Acrylate	68.00
Methylene Dichloride (Resale)	20.00

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nyl Acetate Monomer	55.00

OLVENTS	Per Litre
enzene	12.50
Heptane	10.50
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ethanol	8.50
olvent Naphtha Heavy	10.50
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oluene	16.00
ylene	24.00

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Alphanaphthylamine	65.00
Alpha Naphthol (Imp.)	155.00
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Ammonium Molybdate	225.00
Anthraquinone	125.00
Anthranilic Acid	78.00
2-Amino 4-Nitrophenol	140.00
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Beta Naphthol (Atul)	62.00
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Coach Acid	52.00
C. Acid (Imp.)	200.00
Cyanuric Chloride	165.00
2,4- DNCB	28.00
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J. Acid Urea	440.00
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Sulphanilic Acid	30.00
Sulpho Tobias Acid	142.00
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Iso Butyl Alcohol
Iso Butyric Acid
Iso Propyl Alcohol
Lithium Hydroxide
Magnesium Oxide
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Methyl Cellulose 4000
Methyl Cellosolve
Methyl Formate
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Methyl Ethyl Ketone
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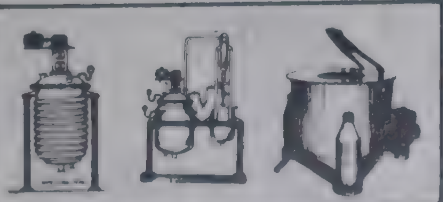

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Bombay Drugs Market

(Prices as on September 18, 1990)

Product	Rs./kg.	Product	Rs./kg.	Product	Rs./k
Acriflavine DPC	850.00	Diphenhydramine HCL	310.00	Morpholine	140.0
Aluminium Hydroxide IP	43.00	Disodium Hydrogen Citrate	43.00	Niacin	220.0
Ampicillin Trihydrate	1750.00	Ephedrine HCL	1900.00	Niacinamide	270.0
Aminophylline	335.00	Erythromycin Estolate	2250.00	Nifidipine	1750.0
Albendazole	2100.00	Erythromycin Stearate	2050	Nitrofurazole	280.0
Analgin	280.00	Ethambutol IP	900.00	Oxyphenbutazone	625.0
Aspirin IP	85.00	Ethophylline	650.00	Papaverine HCl	2000.0
Atenolol	2850.00	Ferrous Fumarate	38.00	Paracetamol	155.0
Benzoic Acid IP	34.00	Folic Acid IP	3200.00	Pectin IP	425.0
Bromine	65.00	Furosemide IP	2200.00	Pepsin 1:3000	375.0
Bromhexine HCL	2250	Furazolidone IP	400.00	Phenbarbitone	510.0
Butylated Hydroxy Toluene	650.00	Guanidine Nitrate	40.00	Pheniramine Maleate	1100.0
Caffeine Citrate IP	360.00	Gallic Acid	285.00	Phenyl Butazone USP	550.0
Caffeine IP	385.00	Haloperidone	19,000.00	Piperazine Citrate	95.0
Calcium Gluconate IP	45.00	Hematropine Methyl Bromide	12.00	Piperazine Hexahydrate	80.0
Calcium Glycerophosphate	160.00	Hydrazine Hydrate	80.00	Potato Starch	65.0
Calcium Lactate	40.00	Ibuprofen IP	370.00	Propanolol HCL	1700 0
Calcium Phenthonate	635.00	Indomethazine	825.00	Pseudoephedrine HCL	2200.0
Cetrimide IP	210.00	I.N.H.	280.00	Pyrazinamide	1325.0
Chloramphenicol Powder	1650.00	Inosite IP	900.00	Ranitidine	310
Chlorbutol	95.00	Iodochloro	500.00	Rifampicin IP	3900.0
Chlorhexidine Gluconate 20% BP	225.00	Lactose IP	38.00	Saccharine Sodium	215.0
Chloroquin Phosphate	850.00	Lactic Acid	90.00	Salbutamol Sulphate	7300.0
Chlorpromazine HCL	1500.00	Levamisole	1500.00	Sodium Iodide	425.0
Choline Chloride FG	35.00	Lignocaine HCL	290.00	Sodium Methoxide	96.0
Choline Chloride IP	65.00	Lignocaine Base	325.00	Sorbitol Powder	115.0
Cloxacillin Sodium	2150.00	L. Lysine Feed	85.00	Sorbitol USP	13.0
Cimetidine	2050.00	L. Lysine Pharma	300.00	Sulphacetamide	300.0
Citric Acid IP	38.00	Magaldrate IP	40.00	Sulphamethoxazole	305.0
C.P. Maleate	1150.00	Magnesium Hydroxide	30.00	Tinidazole	375 0
Cyproheptadine Tcl	9500.00	Magnesium Trisilicate IP	11.00	Theophylline Anhydrous	390.0
Dexamethasone	95.00	Mannitol USP	102.00	Thiacetazone	275.0
Diazepam	800.00	Mebendazole	560.00	Tolbutamide	200 0
Dicyclomine Hcl	1500.00	Mercurochrome NF	280.00	Trimethoprim IP	980 0
Diethyl Carbamazine Citrate	300.00	Methyl Chloroformate	80.00	Vitamin A Palmitate	2600.00
Di-iodohydroxyquinoline	570.00	Metochlopromide TCL	1800.00	Vitamin B6 Hydrochloride	1400.00
Diloxanide Fumarate Ip	500.00	Metronidazole IP	415.00	Vitamin B2 5-Phosphate	4100.00

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Tel. No. 5558265, 5557732, 4112934 * Cable: TRICOGOLD, Bombay-400 071.

Bombay Dyes Market

(Prices as on September 18, 1990)

D COLOURS	Per Kg.
Violet 4BS	*190.00
Maroon V	110.00
Orange II	112.55
Orange IIY	93.85
Red A	137.00
Scarlet 3R	128.35
Red 38N	*195.00
Red R2R	132.00
Red RS	88.00
Patent Blue AS	*280.00
Green V	*375.00
Coomasi Blue	200.00
Yellow 5GN	65.00
Red PG	85.00
Red GRS	78.00
Black 10 BX	157.15
Black BX	126.95
Black Wax	135.50
sein Scarlet MOO	200.30
cinil Yellow GS (ICI, UK)	265.00
cinil Red GS (ICI, UK)	530.00
cinil Blue RS (ICI, UK)	315.00
cinil Scarlet G (ICI, UK)	600 00
cinil Orange G (ICI, UK)	250.00
cinil Rubine (ICI, UK)	550.00

o get resale price add 6% tax.

RECT COLOURS	Per Kg.
llow 3GX	114.00
n Yellow RCH	175.85
st Yellow GCH	171 50
llow CFG Hly Conc.	721.00
st Yellow GS	126 96
st Yellow CHRS	116.85
scose Orange A	210 35
st Orange GR	171.50
ed	122.65
ark Tan	98.15
ed IIR	98.15
ed 4B	217 55
ordeaux BW	170 10
ast Scarlet 4BS	223 50
ed 12B	220 45
ordeaux Hly. Conc	249 20
otton Red N	117 05
rill. Fast Helio B	362 85
Brill. Fast Helio 2R	385.83
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50
Red 2B	422.40
Red FB	425.80
Red Violet FBL	622.00
Orange 3R	254.20
Violet 3R	370.50
Violet RL	355.70
Violet 6R	638.20
Scarlet RR	283.50
Rubine 3B	289.10
Rubine CB	449.50
Blue GL	419.00
Blue BGF	805.80
Navy Blue RE	359.90
Brown 3REL	272.80
Black GEL	420.10
Dark Brown 3B	411.10

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc.	611.50
Red B 2B Conc.	797.90
Red CB Powder	1048.25
Red D2B Powder	580.65
Violet C 4R	1202.70
Blue BG Powder	580.65
Blue BN Powder	128.25
Blue D 2R Powder	588.25
Navy BT Conc.	531.95
Blue B 2G Conc.	577.95
Blue BT Conc.	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320 80
Pink REL	593 00
Red BEL	615 60

BASE COLOURS	Per Kg.
Fast Yellow GC	77.75
Fast Orange GC	128.40
Fast Scarlet R	198.05
Fast Scarlet RC	128.40
Fast Scarlet RCR	105.60
Fast Scarlet G	115.75
Fast Scarlet GN	92.95
Fast Scarlet GG	77.75
Fast Scarlet GGS	73.95
Fast Red B	233.50
Fast Red RC	115.75
Fast Red R Flakes	158.80
Fast Red TR	181 60
Fast Red TR Oil	223.35
Fast Red RL	251 20
Fast Red KB Oil	251 20
Fast Bordeaux GP	236.00
Fast Garnet GBC	103 05
Fast Violet B	548 80
Fast Blue BB	566.50

NAPHTHOL COLOURS	Per Kg.
ASG	301 85
AS	205 65
ASSW	379 10
ASBS	253 75
ASBO	266 40
ASD	209 45
ASOL	243 60

Delhi Market

DELHI:14(NNS) — Paraffin wax recorded a modest rise of Rs. 150 at Rs. 1250 (Per 50 Kgs.) in the Delhi chemicals market during last week, following negligible supply combined with spurt in demand from candle manufacturers. It may be noted here that in the first week of August, its prices were stated at Rs. 975 (per 50 Kg.) Following inadequate stock and rise in demand from consumers, slack and match wax jumped up sharply by Rs. 2,000 and touched a peak level of Rs. 14,000 and Rs. 21,000 per tonne and in support with match wax prices of residue wax spurted from Rs. 3,800 to Rs. 4,200 per tonne. Safolite jumped up by Rs. 1.50 at Rs. 58.50 per kg. on account of dwindling stock and good demand gur and Khandsari manufacturers. As a result of shortage of imported goods, chatkolite Chinese hardened by 50 paise at Rs. 55.50 per kg. Sodum nitrite flared up sharply by Rs. 50/175 at Rs. 1050/1275 in absence of fresh arrivals and sustained demand from stockists. Ammonia bicarb looked up by Rs. 10 at Rs. 180 per 25 kg. in the face of increased demand from bakeries. Sodium hydro sulphite Gulshan advanced by Rs. 2 at Rs. 43. Sodium hydro sulphite Tamil Nadu, Damosha, Kalali and Rangolite Germany remained firm at Rs. 43, Rs. 45, Rs. 46 and Rs. 90 per kg. respectively. Arrivals of menthol was reported around 5 tonnes from Sambhol, Moradabad, Rampur, Amroha and Chandausi areas of U.P., coupled with slack demand from Afghanistan and Pakistan. Menthol medium and bold drifted lower by Rs. 10 each at Rs. 300 and Rs. 325. Menthol flake also followed suit and reacted downward by Rs. 5 at Rs. 280. Soda bicarb Nal and caustic soda flake slumped by Rs. 5 and Rs. 10 at Rs. 325 and Rs. 525 per 50 kg. Titanium dioxide TTK and RC-822 quoted cheaper by Rs. 2 at Rs. 63 and Rs. 88 on withdrawal of demand. RCR-2 and K-brand of Calcutta side slipped by Rs. 2 at Rs. 92 and Rs. 4 at Rs. 58 due to poor enquiries. Dyes and colours did remained constant.

(DELHI MARKET RATES AS ON SEPTEMBER 14, 1990)

Ammonia Bicarb (Per 25 Kg.)	180.00
Mercury (Per flask)	11,100.00
Soda ash (Per bag)	360/373.00
Ammonium Chloride (50 Kg.)	120/180.00
Caustic soda flakes (50 Kg.)	525.00
Citric acid (Per 50 Kg.)	1,900/2,350.00
Stable Bleaching Powder • Shriram (Per 25 Kg.)	101.00
Stable Bleaching Powder KCl (Per 25 Kg.)	90.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	91.00
Stable Bleaching Powder Modi (Per 25 Kg.)	92.00
Sodium Bicarbonate (50 Kg.)	315/325.00
Sodium Hydrosulphite (Per Kg.)	42/46.00
Rangolite (Per Kg.)	90.00
Tartaric acid France (Per Kg.)	300.00
Sufolite (Per Kg.)	58.00
Chatkolite (Per Kg.)	55.50
DMO (per Kg.)	88.00
Boric acid Technical (Per 50 Kg.)	1,550.00
Paraffin Wax (Per 50 Kg.)	1,250.00
Slack wax (Per metric tonne)	14,000.00
Tartaric Acid (Swastik Per Kg.)	210.00
Borax Granular (Per 50 Kg.)	850.00
Borax Crystal (Per 50 Kg.)	875.00
Sodium Nitrite (Per 50 Kg.)	1,050/1,275.00
Sodium Nitrate (Per 50 Kg.)	500.00
Camphor Thal (Per Kg.)	110.00
Camphor Powder (Per Kg.)	96.00
Menthol Bold (Per Kg.)	325.00
Menthol Medium (Per Kg.)	300.00
Menthol Flake (Per Kg.)	280.00
Mentha Oil (Per Kg.)	192.00
Glycerine (Per Kg.)	55/58.00
Sodium Silicate (Per quintal)	300/400.00
Hexamine (Per Kg.)	34.00
Acetic Acid Glacial (Per Kg.)	13.75
Copper Sulphate (Per quintal)	2,300/2,600
Formic Acid (Per Kg.)	24.00
Formaldehyde (Per Kg.)	8.50
Hydrogen Peroxide (Per Kg.)	38.00
Calcium Carbonate (Per Tonne)	2,800/5,800
Acid Slurry Soft (Per Kg.)	27.00
Acid Slurry Hard (Per Kg.)	32.00
Phosphoric Acid (Per 50 Kg.)	1,235.00
Potassium Nitrate (Per quintal)	1,000/1,250.00
Potassium Permanganate (Per 50 Kg.)	2,600/3,000.00
Sodium Bichromate (Per 50 Kg.)	1,575/1,600.00
Trisodium Phosphate (50 Kg.)	625.00
Titanium Dioxide Anatase T.T.P. (Per Kg.)	63.00
Titanium Dioxide RC-822 (Per Kg.)	90.00
Titanium Dioxide Anatase K-Brand (Per Kg.)	58.00
Titanium Dioxide RCR-2 (Per Kg.)	92.00
Zinc Oxide (Per Kg.)	46.00/50.00
Phenol Carbolic Acid (Per Kg.)	39.00
Carbon Tetrachloride (Per Kg.)	24.75
Chloroform (Per Kg.)	28.00
Sodium Sulphate (Per metric tonne)	3,600/3,900.00
Naphthalene Balls (Per 50 Kg.)	1,350.00
Match Wax	21,000
Residue Wax	4,200

DYES & COLOURS	(Per Kg.)
Naphthol AS	175/211.50
Naphthol ASG	180/249.70
Naphthol ASBS	210/260.75
Naphthol ASTR	300/378.92
Naphthol ASOL	210/250.90
Naphthol ASBO	195/274.30

DIRECT DYES	(Per Kg.)
Black E. Conc.	120/185.30
Diazo Black B.T.	105/154.50
Green B	90/147.55
Blue 2-B	60/107.00
Blue 2-B 225% (JNR)	125.00
Sky Blue FB	160/248.20
Basic Auramine	55/110.00
Basic Rhodamine	300/425.00
Basic Methylene Blue	100/180.00
Basic Violet	165/210.00
Basic Malachite Green	175.00
Acid Orange	75/111.20
Congo Red H/C	75/120.95

Madras Market

Market was buoyant though it was less when compared to conditions prevailing in Bombay. Many items were sent to Bombay from Madras taking advantage of the high prices prevailing there and on account of this trend prices went up during the late part of the week. Hydrogen Peroxide and Sodium Nitrate continued to be in short supply. The price raise was prominent in solvent section. Acetone prices went up to Rs. 22 and on account of it Ethyl Acetate prices also shot up. Because of NOCIL shutdown prices of items like Normal Butanol, IPA, DEG, PEG went up. Methanol supplies from Indian manufacturer was poor and the imported stocks that came under OGL 3/4 months back have also dried up. The prices of methanol went up to Rs. 12 per kg. There has been a marginal raise in the prices went up to Rs. 35 per kg. Hydros of acetic acid, but acetic anhydride prices have also gone up due to increase in rates by the manufacturer.

(MADRAS MARKET RATES AS ON SEPTEMBER 15, 1990)

Acetic Acid Glacial (per kg)	16.00
Aluminium Sulphate Iron free (per MT)	4,000.00
Ammonium Bicarbonate (per 25 kgs)	160.00
Ammonium Chloride (per MT)	2,450.00
Acid Slurry (per kg)	32.00
Barium Carbonate (per kg)	10.00
Barium Chloride (per kg)	9.00
Boric Acid Technical (per kg)	26.00
Bleaching Powder (per 50 kgs)	220.00
Borax (per 50 kgs)	800.00
Caustic Soda Flakes -- Mettur Chemicals (per MT)	11,000.00
Caustic Soda Flakes -- Andhra Sugars (per MT)	11,000.00
Calcium Chloride 70% Solid (per MT)	4,000.00
Calcium Chloride Anhydrous (per MT)	6,500.00
Calcium Carbonate (Activated) (per MT)	6,750.00
Calcium Carbonate (Precipitated) (per MT)	5,500.00
Citric Acid (per kg)	48.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	135.00
Pure Para Cresol 96% (per kg)	90.00
Meta Para Cresol 42% (per kg)	52.00
Formic Acid (per kg)	27.00
Formaldehyde (per kg)	8.00
Glue Flakes (per kg)	15.00
Glycerine I.W. (per kg)	49.00
Hydrosulphite of Soda (TCPL) (per kg)	40.00
Hydrosulphite of Soda (IDI) (per kg)	41.00
Hydrosulphite of Soda (BASF) (per kg)	49.00
Hexamine (per kg)	31.50
Hyflosupercell (per kg)	23.00
Hydrogen Peroxide (per kg)	40.00
Litharge (per kg)	38.00
Lead Acetate (per kg)	38.00
Magnesium Carbonate (per kg)	18.00
Magnesium Chloride (per kg)	4.00
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	345.00
Oxalic Acid (per kg)	18.00
Paraffin Wax (per kg)	18.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	29.00
Polyvinyl Alcohol Powder (per kg)	150.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	36.00
Soda Ash (TAC) (per 75 kgs)	410.00
Soda Ash (TATA) (per 75 kgs)	410.00
Sodium Bicarbonate (TATA) (per 50 kgs)	385.00
Sodium Silicate (per MT)	4,000.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	24.00
Sodium Sulphide Flakes (per kg)	20.00
Sodium Bisulphite (per kg)	8.00
Sodium Alginate (per kg)	295.00
Sodium Acetate (per kg)	7.50
Sodium Sulphate (Anhydrous) (per kg)	4.00
Titanium Dioxide (Anatase) (per kg)	63.00
Titanium Dioxide (Rutile) (per kg)	85.00
Trisodium Phosphate (per kg)	10.00
Urea (Technical) (per kg)	3.00
Zinc Oxide (per kg)	52.00
Zinc Chloride Powder (per kg)	14.
Zinc Sulphate (per kg)	8.

SOLVENTS

Acetone -- HOCL (per kg)	22.
Butanol (per kg)	38.
Butyl Acetate (per kg)	45.
Benzene (per lit)	14.
Cellosolve (per kg)	65.
Carbon Tetra Chloride (per kg)	23.
Chloroform (per kg)	29.
Diacetone Alcohol (per kg)	30
Diethylene Glycol (per kg)	38
Dichloroethane (per kg)	18
Di-octyl Phthalate (per kg)	48
Di-N-butyl Phthalate (per kg)	48
Ethyl Acetate (per kg)	22
Isopropyl Alcohol (per kg)	38
Methanol (per kg)	12
Methylene Chloride (per kg)	23
Methyl Ethyl Ketone (per kg)	38
Methyl Isobutyl Ketone (per kg)	41
Phenol (per kg)	40
Sorbitol (per kg)	15
Triethanolamine (per kg)	10
Trichloroethylene (per kg)	2
1-1-1 Trichloroethane (per kg)	2
Turpentine (per lit)	1
Toluene (per lit)	1
Xylene (per lit)	2

CALCUTTA MARKET

(Prices as on Sep. 15, 1990)

Acetic acid (per 50 kg)	750.00
Basic chrome sulphate (per 50 kg)	800.00
Benzene (litre)	11.50
Bleaching powder (bag)	235.00
Borax granular (per 50 kg)	800.00
Boric acid (per 50 kg)	1,625.00
Camphor (per kg)	102.00
Caustic soda lye (per ton)	10,020.00
Caustic soda flakes (per 50 kg)	560.00
Glycerine (per kg)	53.50
Menthol bold (per kg)	570.00
Menthol medium (per kg)	380.00
Menthol small (per kg)	300.00
Phosphoric acid (per 50 kg)	1,400.00
Phenol (per kg)	38.50
Soda ash (75 kg)	395.00
Sodium bichromate (per 50 kg)	1,500.00
Sodium bicarbonate (per 50 kg)	340.00
Sodium nitrate (per 50 kg)	450.00
Sodium sulphate anhydrous (per 50 kg)	320.00
Sulphuric acid (per ton)	2,200.00
Trisodium phosphate (per 50 kg)	610.00
Toluene (litre)	16.50

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

ue ate 1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Approx. sailing dt. (5)
4/9	Leninskiy Pioner	Marathon	Boston; New York; Baltimore; Norfolk. (Carting at T.P. No. 3).	27/9
/10	Buzet (V-6/90)	Oceanic	New York; Baltimore; Philadelphia; Chicago; Boston; Norfolk; Atlanta; Charleston; Savannah; Miami; Houston & Other inland destinations in U.S. East Coast & S. American Ports. (Carting at Wadi Bunder No. 3).	4/10
/10	Anika Oltmann	Samrat/ Hindustan/ L. Triest	Boston; New York; Baltimore; Norfolk; Charleston; P. Mouth; P. Lauderdale; Miami; New Orleans; Savannah; Jacksonville; P. Everglades; Philadelphia; Halifax; Montreal; Toronto; & S. American Ports. (Carting at M.O.D. No. 1 for Samrat & Hindustan) (Carting at M-171/173 C.D. for L. Triest).	8/10
6/9	Lanka Abhaya	Seahorse	New York; Baltimore; Charleston; Norfolk. (Carting at M.O.D. No. 3).	30/9
0/9	Ever Bridge (Voy-038)	Greenways	New York; Newark; Baltimore; Charleston; New Orleans; Houston; Boston; Providence (RI); Philadelphia; Norfolk; Savannah; Jacksonville; Wilmington; Miami; Montreal; Toronto; Bermuda; Los Angeles; Longbeach; San Francisco; Oakland; San Diego; Stockton; Richmond; Almeida; Redwood City; Sacramento; Seattle; Portland; Vancouver (B.C.); Tacoma; Longview; Chicago; Dallas; Various inland destinations and Caribbean Ports. (Carting at G/H Cotton Depot).	26/9
8/9	Stonewall Jackson (Ame)	M.S.P.L.	Philadelphia; Baltimore; Norfolk; New Orleans; Houston; Savannah; New York. (Carting at P/Q-PD).	29/9
/10	Anika Oltmann	L. Triest	With T.P. Lagos/Apapa; Abidjan; Dakar; Douala; Cotonou; Nouakchott; Libreville; Matadi; Conakry; Freetown. (Carting at M-171/173 Cotton Depot).	8/10
3/9	Oyster Bay (Voy-4053)	Arebee	Lagos/Apapa; P. Harcourt; Abidjan; Tema; Takordi; Monrovia; Lome; Freetown; Cotonou; Douala; Matadi. (Carting at M-Jetha C.D.).	26/9
/10	Anika Oltmann	Samrat/ Hindustan	Felixstowe; Hamburg; Rotterdam; Also London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembly; Birmingham; Liecester; Le Havre; Bremen; Amsterdam; Antwerp; Copenhagen; Leeds; Aarhus; Gothenburg; Oslo; Helsinki; Stockholm; Belfast & all destination in U.K.; Benelux; Germany; Italy; France; Switzerland & Austria.	8/10
			Barcelona; Marseilles; La Spezia; Livorno; (Leghorn); Genoa; Naples and other Italian Ports and FCL only Beirut; Alexandria; Valletta; Lattakia; Mersin. (Carting at M.O.D. No. 1 for Samrat & Hindustan).	
		Killick/	Felixstowe; Rotterdam; Hamburg; Antwerp; Le Havre; Lisbon; Leixoes; London; Liverpool; Manchester; Bristol; Avonmouth; Leeds; Glasgow; Tilbury; Birmingham; Dublin; Belfast; Bremen; Bremerhaven; Aarhus; Copenhagen; Gothenburg; Helsingborg; Oslo; Helsinki; Alexandria; Lattakia; Mersin; Malta; Limmassol; Piraeus. (Carting at E-Shed Grain Depot).	
		L. Triest	Barcelona; Marseilles; Genoa; Leghorn; La Spezia; Naples with TP Trieste; Venice; Ravenna; Bari; Koper; Rijeka; Las Palmas; Santacruz; De Teneriffe; Malta; Limmassol; Alexandria; Tunis; Benghazi. (Carting at 171/173 Cotton Depot).	
0/9	Drvar (Yug)	Oceanic	Hodeidah; Jeddah; P. Said; Rijeka.	30/9
/10	Buzet (Yug)	Oceanic/	P. Said; Rijeka; Trieste; Venice; Med. Ports. (Carting at Wadi Bunder No. 3)	
		L. Triest	Trieste; Venice; Ravenna; Rijeka; Ancona. (Carting at M-171/173 CD).	4/10
6/9	Lanka Abhaya	Seahorse/	Felixstowe; London; Liverpool; Manchester; Avonmouth; Dublin; Glasgow; Wembly; Liecester; Immingham; Birmingham; Leeds; Antwerp Bremen; Copenhagen; Gothenburg; Hamburg; Rotterdam; Oslo; Stockholm; Helsinki; Aarhus; Malmao; Norkopping. (Carting at M.O.D. No. 3).	30/9
		Mackintosh	Aqaba; Hodeidah; Aden; Jeddah. (Carting at T.P. No. 4).	

(1)	(2)	(3)	(4)	(5)
20/9	Ever Bridge (V-038) (Pan)	Greenways	Hamburg; Felixstowe; Rotterdam; Antwerp; Le Havre; London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembly; Birmingham; Leeds; Leicester; Amsterdam; Bremen; Copenhagen; Aarhus; Gothenburg; Oslo; Stockholm; Helsinki; Belfast & all destinations in U.K.; Germany; Switzerland & Austria. (Carting at G/H Cotton Depot).	26/9
23/9	Oyster Bay (Dan)	P&O/	Assab; Djibouti; P. Sudan. (Carting at Timber Pond No. 3).	26/9
		Arebee	P. Said; Alexandria; Piraeus; Venice; Trieste; Genoa; Koper; Naples; Fos; Barcelona; Valencia; Ravenna; Livorno; Las Palmas; Limmassol; Constanza; Budapest. (Carting at M-Jetha Cotton Depot).	
24/9	Leninskiy Pioner (Rus)	Transocean/	Tilbury; Avonmouth; Liverpool; Manchester; London; Felixstowe; Birmingham; Antwerp; (Rotterdam); Hamburg; Bremen; Copenhagen; Gothenburg; Oslo; Stockholm; Malmao; Leeds. (Carting at TP No. 3).	27/9
		I.S.S. Co.	Felixstowe; Tilbury; Antwerp; Rotterdam; Hamburg; Bremerhaven & Scandinavian Ports via Hamburg. (Carting at E-Grain Depot).	
28/9	Stonewall Jackson	M.S.P.L.	Assab; P. Suez; (Alexandria). (Carting at P/Q-PD).	29/9
30/9	Yulius Fuchik (Rus) (V-112 W/B)	Transocean	Odessa; Izmail; Reni (U.S.S.R.); Russe; Bulgaria; Budapest (Hungary); Linz; Vienna (Austria); Britislava (Czechoslovakia); Deggendorff; Regensborg (West Germany). (All Ports on River Danube).(Carting at N/O-PD & G-PD).	1/10
26/9	Lanka Abhaya	Seahorse	Colombo. (Carting at M.O.D. No. 3).	30/9
26/9	Lanka Abhaya	Seahorse	Singapore; Penang; P. Kelang; Bangkok; Hongkong; Keelung; Kobe; Yokohama & FCL only Busan; Inchon; Osaka; Tokyo; Nagoya; Kaohsiung. (Carting at M.O.D. No. 3).	30/9
20/9	Ever Bridge (V-038) (Pan)	Greenways	Singapore; Penang; Port Kelang; Bangkok; Djakarta; Surabaya; Manila; Cebu; Kaohsiung; Keelung; Osaka; Yokohama; Kobe; Shimizu; Moji; Nagoya; Busan; Hongkong. (Carting at G/H Cotton Depot).	26/9
28/9	Stonewall Jackson	M.S.P.L.	Singapore; P. Kelang. (Carting at P/Q-PD).	29/9
26/9	Lanka Abhaya	Seahorse	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Carting at M.O.D. No. 3).	30/9
17/9	Ermioni	Jades Ship	Dubai.	26/9
18/9	Rossana (Ind)	Mackintosh	Dubai; Muscat. (Carting at C-PD).	26/9
23/9	Oyster Bay (V-4053) (Dan)	Arebee/	Dar Es Salaam & Mombasa (Direct); Kampala; Jinja; Torroro; Lugazi; Entebee (Uganda); Kigali (Rwanda); Kitwe; Lusaka; Ndola (Zambia); Lilongwe; Blantyre (Malawi); Maputo; Zanzibar. (Carting at M.J.C.D.).	26/9
		P&O	Mombasa; Dar Es Salaam (Direct); Beira; Mahe & Inland destinations in East Africa. (Carting at Timber Pond No. 3).	
23/9	Any	SDS Corp.	P. Louis; Tamatave; Re Union	2/10

VESSELS DUE FOR IMPORT DISCHARGE

Due Date	Steamer's Name	Agents	From
2/10	Anika Oltmann	Samrat/Hindustan/L. Triest	U.K. Cont. & Med.
30/9	Jala Copal	S.C.I.	U.S./Canada
26/9	Lanka Abhaya	Seahorse	U.K. Cont.
30/9	S/o. Haryana	S.C.I.	U.K. Cont.
27/9	Seacrest Achiever (V-221)	Seaspeed/Oceanic	U.K. Cont. & U.S.A.
30/9	Yulius Fuchik (V-112)	Transocean	Russia/Europe

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Materials Imported/Exported

DYE MATERIALS EXPORTED BOMBAY

(From 18.2.90 to 23.2.90)

FAST BLUE CBR: To Rotterdam: Colour Chem Ltd., 4,400 Kgs., Rs. 8,58,696.

FAST RED B BASE: To Keelung: Kantilal Sanghvi & Co., 500 Kgs., Rs. 52,936

GREEN FB EX. CONC.: To Hong Kong: Colour Chem Ltd., 2,500 Kgs., Rs. 1,09,029

INDROCRON BLACK: To Busan: Indokem Ltd., 1,000 Kgs., Rs. 89,957.

METALANRED BD: To Jakarta: Anil Dyechem Industries, 500 Kgs., Rs. 80,702.

METALAN SCARLET GD: To Jarkarta: Anil Dyechem Industries, 1,500 Kgs., Rs. 12,31,957.

METHYLENE VIOLET: To Colombo: Shriram Refrigeration Industries Ltd., 1,000 Kgs., Rs. 1,23,495.

NAVINON BLACK BB: To Barcelona: IDI, 500 Kgs., Rs. 1,38,000.

NAVINON BLUE BC: To Gdansk: IDI, 500 Kgs., Rs. 1,62,000.

NAVILENE BRILL RED: To Genoa: IDI, 1,000 Kgs., Rs. 5,08,000.

NAVINON BROWN G: To Barcelona: IDI, 100 Kgs., Rs. 37,000.

NAVINON BROWN BR: To Genona: IDI, 1,000 Kgs., Rs. 36,000.

NAVINON JADE GREEN 2 A: To Genoa: IDI, 500 Kgs., Rs. 2,27,000.

NAVINON NAVY BLUE TRR: To Genoa: IDI, 1,500 Kgs., Rs. 5,74,000.

NAVINON OLIVE T: To Genoa: IDI, 1,000 Kgs., Rs. 2,04,000.

OLIVE GREEN FGR EX. CONC.: To Colombo: Colour-Chem Ltd., 150 Kgs., Rs. 7,375.

OPTICAL WHITENING AGENT: To Priok: Metro Exporters Ltd., 2,000 Kgs., Rs. 98,178.

PHTHALOCYANINE BLUE: To Dusseldorf: Jay Chem. Industries, 10,000 Kgs., Rs. 7,31,914.

PHTHALOCYANINE GREEN: To Rotterdam: Colour Chem. Ltd., 500 Kgs., Rs. 96,901.

PRINTING INKS: To Monrovia: United Ink & Varnish Co., 840 Kgs., Rs. 39,100.

REACTIVE BLACK B: To Genoa: Anil Dye Chem Industries, 2,000 Kgs., Rs. 4,00,630.

REACTIVE BLACK: To Hong Kong: Metrochem Industries, 3,000 Kgs., Rs. 2,65,617.

REACTIVE ORANGE 42 R: To Karachi: Atlas Dye Chem Industries, 2,000 Kgs., Rs. 3,65,000.

REACTIVE RED 180: To New York: Anil Industries, 2,000 Kgs., Rs. 1,80,000.

REACTOFIX ORANGE H2R: To Port Keelang: Jaysynth Dyechem, 400 Kgs., Rs. 72,340.

REACTOFIX SUPRA BLACK HBL: To Chittagong: Jaysynth Dyechem Ltd., 3,050 Kgs., Rs. 3,23,000.

REACTOFIX SUPRA BROWN: To New York: Jaysynth Dyechem, 4,000 kgs., Rs. 7,77,872.

REMAZOL BLACK B: To Charleston: Colour Chem., 12,000 Kgs., R.s 11,38,744.

REMAZOL TURQUIOSE BLUE G CONC.: To Hong Kong: Colour Chem Ltd., 5,000 Kgs., Rs. 7,40,583.

TRIFIX YELLOW S. FG: To Karachi: Karsandas Mavji, 625 Kgs., Rs. 65,747.

TURQUOISE BLUE SBL: To Keelung: Kantilal Sanghvi & Co., 1,000 Kgs., Rs. 67,000.

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ULTRAMARINE BLUE: To Mina Qaboos: Indo Gulf Trading Co., 500 Kgs., Rs. 61,276.

VAT GREEN 2: To Hamburg: Liberty Exports, 1,000 Kgs., Rs. 4,77,956.

VERACID BLACK: To Lagos: Vera Dyechem Industries, 800 Kgs., Rs. 1,00,968.

MATERIALS EXPORTED BOMBAY

(From 24.2.90 to 4.3.90)

ALUM: To Kuwait: P.J. Exports, 500 Kgs., Rs. 3,500.

BENZIDENE DI HYDRO CHLORIDE: To Piraecus: K. Mavji, 6,250 Kgs., Rs. 4,16,357.

CUPROUS CHLORIDE: To Mannhein: Shyam Chemicals P. Ltd., 18,000 Kgs., Rs. 6,30,000.

DICALCIUM PHOSPHATE: To Osaka: Nayankumar & Co., 20,000 Kgs., Rs. 1,03,829; To Qaboos: India Gelatine & Chemicals Ltd., 2,50,000 Kgs., Rs. 9,95,744.

ENDOSULPHAN: To Hong Kong: Excel Inds. Ltd., 66,000 Kgs., Rs. 71,14,894.

ETHION TECH: To Barcelona: Rallis India Ltd., 5,000 Kgs., Rs. 4,60,585.

GAMMA ACID: To Milano: Priya Chemicals, 3,400 Kgs., Rs. 3,87,851.

H ACID: To Milano: Priya Elect & Chemicals, 7,700 Kgs., Rs. 5,49,851.

HEXACHLOROETHANE: To Nagoya: Scottish Chemicals, 20,000 Kgs., Rs. 3,56,000.

12 HYDROXY STEARIC ACID: To Felixstowe: Jayant Oil Mills, 56 Mts., Rs. 12,82,382.

MALEIC ANHYDRIDE: To Manila: Adarsh Chem & Fert Ltd., 18,000 Kgs., Rs. 2,45,110.

METANILIC ACID: To Milano: Priya Elect & Chemicals, 3,000 Kgs.,Rs. 1,22,659.

OXALIC ACID: To Rotterdam: Excel Inds. Ltd., 4,000 Kgs., Rs. 5,44,680.

PHTHALIC ANHYDRIDE: To Manila: Mysore Petro Chemicals Ltd., 1,80,000 Kgs., Rs. 9,00,766.

RED OXIDE POWDER: To Manila: Dhirajlal & Co., 78.2 Mts., Rs. 1,29,668.

SODIUM HYDROSULPHATE: To Charleston: Products & Product P. Ltd., 20,000 Kgs., Rs. 3,40,426.

SODIUM SULPHATE: To Bangkok: Grasim Inds. Ltd., 700 Mts., Rs. 13,89,944; To Mina Qaboos: Grasim Inds., 215 Mts., Rs. 5,19,336.

PARA TOLUENE SULPHONAMIDE: To Antwerp: Ushma Inds., 2,000 Kgs., Rs. 80,000.

DYE MATERIALS EXPORTED BOMBAY

(24.2.90)

ACID GREEN 16: To Genoa: Indodyes Chemicals Inds., 200 Kgs., Rs. 63,404.

ACID RED 88: To Genoa: Priya Elect & Chemicals, 1,010 Kgs., Rs. 88,395.

ACID RED 131: To Genoa: Coloursynth Inds., P. Ltd., 1,000 Kgs., Rs. 2,04,915.

ACID RHODAMINE B.: To Rotterdam: Navin Chemical Enterprises, 1,000 Kgs., Rs. 5,27,250.

AZOIC DYES: To Port Kelang: Ranbaxy Labs Ltd., 1,000 Kgs., Rs. 15,000.

BENZASOL BLACK BC: To Chicago: Chamiquip Ltd., 8,000 Kgs., Rs. 8,51,064.

BLACK OXIDE: To Genoa: Selective Minchem & Colour Inds., 42,000 Kgs., Rs. 1,02,017.

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FAST BLUE: To Rotterdam: Colour Chem Ltd., 3,950 Kgs., Rs. 7,69,507.

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FAST TURQUOISE: To Antwerp: Sanjay Sales Corpn., 1,000 Kgs., Rs. 71,558.

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METANIL YELLOW: To Keelung: Globe (I) Enterprise, 1,020 Kgs., Rs. 74,299; To Kuwait: Esufali Akbarali & Co., 1,000 Kgs., Rs. 38,000.

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NAVINON BROWN: To Port Everglades: I.D.I. Ltd., 600 Kgs., Rs. 4,09,000.

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SULPHAMETHOXZOLE BP: To Hong Kong: Arandy Labs. Ltd., 8,500 Kgs., Rs. 19,45,000; Arandy Labs. Ltd., 5,000 Kgs., Rs. 11,43,000.

TINIDAZOLE: To Hong Kong: Arti Organics P. Ltd., 1,000 Kgs., Rs. 2,21,777.

TRIMETHOPRIM BP: To Lagos: Inventaa Chemicals P. Ltd., 170 Kgs., Rs. 97,500.

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ACID FAST RED A: To Ind Expo Trading Co., 1,000 Kgs., Rs. 76,596.

ACID RED 52: To Rotterdam: Priya Electronics & Chemicals Ltd., 1,000 Kgs., Rs. 4,55,421; To Rotterdam: Sandoz (India) Ltd., 1,000 Kgs., Rs. 4,05,958.

ACID RED 119: To Barcelona: Indokem Ltd., 2,000 Kgs., Rs. 2,26,723; To Felistowe: Priya Electronics & Chemicals Ltd., 2,000 Kgs., Rs. 2,04,563.

ACID YELLOW 36: To Genoa: Dintex Dyechem Inds., 500 Kgs., Rs. 47,915.

AMARTHOL AS: To Belfast: Amritlal Chemaux Ltd., 2,000 Kgs., Rs. 2,81,244.

ATUL ACID BLACK: To New York: Atul Products Ltd., 1,000 Kgs., Rs. 1,38,791.

BENZAFIX GOLDEN YELLOW MERL: To Antwerp: Chemiequip, 1,150 Kgs., Rs. 2,34,894.

BRACTZOL YELLOW 3 RS: To Antwerp: Blue Rock Dyes & Chemicals P. Ltd., 2,000 Kgs., Rs. 3,06,383.

CHEMICTIVE YELLOW 4 R: To Antwerp: Chemiequip Ltd., 1,425 Kgs., Rs. 2,30,426.

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DYE INTERMEDIATES: To Barcelona: San Chem Enterprise, 7,600 Kgs., Rs. 3,10,000; To Felixstowe: Priya Chemicals, 4,375 Kgs., Rs. 1,79,308; 3,200 Kgs., Rs. 1,30,840; To Genoa: Gokul Enterprise, 4,990 Kgs., Rs. 3,62,914; 6,792, Kgs., Rs. 4,89,749; 6,093 Kgs., Rs. 6,34,808; Liberty Exports Ltd., 1,157 Kgs., Rs. 82,766; To Genoa: Sandoz Ltd., 2,500 Kgs., Rs. 1,01,489; To Hamburg: Atul Products Ltd., 11,500 Kgs., Rs. 10,98,298; 1,000 Kgs., Rs. 95,966; To Hamburg: Jindal Dye Intermediates Pvt. Ltd., 5,088 Kgs., Rs. 2,51,693; 4,764 Kgs., Rs. 2,27,151; 10,931 Kgs., Rs. 5,25,338; 10,530 Kgs., Rs. 5,06,795; Vipul Dyes & Chemicals P. Ltd., 500 Kgs., Rs. 43,457; To New York: Atul Products Ltd., 4,770 Kgs., Rs. 5,42,458; To New York: Gujarat Dyestuff Inds., 19,251 Kgs., Rs. 15,51,183

DIRECT BLACK 38: To Felixstowe; Priya Electronics & Chemicals Ltd., 5,000 Kgs., Rs. 4,00,010.

DIRECT BLUE 86: To Genoa: Dintex Dyechem Inds., 500 Kgs., Rs. 40,255.

GOLDEN YELLOW HE 4 R: To Hamburg: Colour & Chemicals Inds., 500 Kgs., Rs. 71,000.

MAGENTA P POWDER: To Liverpool: Kabbew Inds. Pvt. Ltd., 3,000 Kgs., Rs. 4,31,337.

METHYLENE BLUE: To Colombo: Karsandas Mavji: 1,750 Kgs., Rs. 1,85,649.

METANIL YELLOW: To Kuwait: Esufali Akbarali & Co., 1,000 Kg., Rs. 36,750.

NAPHTHOL ASCA: To New York: Anar Chemical Inds., 2,000 Kgs., Rs. 3,38,000.

NAPHTHOL ASSW: To Rotterdam: Vipul Dyes & Chemicals P. Ltd., 1,750 Kgs., Rs. 3,76,276.

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REACTIVE RED HE 7 B: To Hamburg: Colour & Chemicals Inds., 500 Kgs., Rs. 69,000.

REACTIVE YELLOW: To Karachi: Colour Chem Ltd., 3,000 Kgs., Rs. 2,47,550.

ULTRA MARINE BLUE: To Colombo: Ind. Expo Trading Co., 5,000 Kgs., Rs. 34,250.

VICTORIA BLUE B BASE: To Antwerp: Chemco International, 300 Kgs., Rs. 80,000.

YELLOW CGR: To Sydney: Jay Chemicals Inds., 700 Kgs., Rs. 1,58,000.

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DIMETRIDAZOLE BP: To London: Euro Asian Inds., 1,500 Kgs., Rs. 3,40,000.

IBUPROFEN BP 88: To Hamburg: Herren Drugs Pvt. Ltd., 5,000 Kgs., Rs. 11,22,000.

ISONIAZID BP 80: To Hamburg: Salpra Pharmaceuticals & Chemicals, 2,000 Kgs., Rs. 3,05,668.

METRONIDAZOLE BENZOATE IP: To Genoa: H.N. Dye Chem Inds. P. Ltd., 950 Kgs., Rs. 2,18,000; To Milano: Unichem Labs. Ltd., 5,000 Kgs., Rs. 11,27,000.

NIACIN BP: To Barcelona: Indian Gum Inds. Ltd., 2,000 Kgs., Rs. 1,86,144.

PARACETAMOL USP: To Barcelona: G. Amphray Labs., 5,000 Kgs., Rs. 4,35,438.

PAS SODIUM B. P. 80: To Barcelona: Biological E. Ltd., 1,500 Kgs., Rs. 3,00,000.

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SULPHAMETHOXAZOLE BP 80: To Barcelona: Euro Asian Inds., 1,000 Kgs., Rs. 2,17,000.

SULPHAMETHOXAZOLE BP 88: To Barcelona: Apte Amalgamations, 2,700 Kgs., Rs. 7,56,322.

SULPHAPHENAZOLE IP: To Mombasa: Hindustan Ciba Geigy Ltd., 3,500 Kgs., Rs. 15,21,638.

TRIMETHOPRIM BP 88: To Cophenhagen: Inventaa Chemicals P. Ltd., 3,000 Kgs., Rs. 15,43,000.

UNDECYLENIC ACID BP: To Marseilles: Jayant Oil Mills, 21,620 Mts., Rs. 16,76,965.

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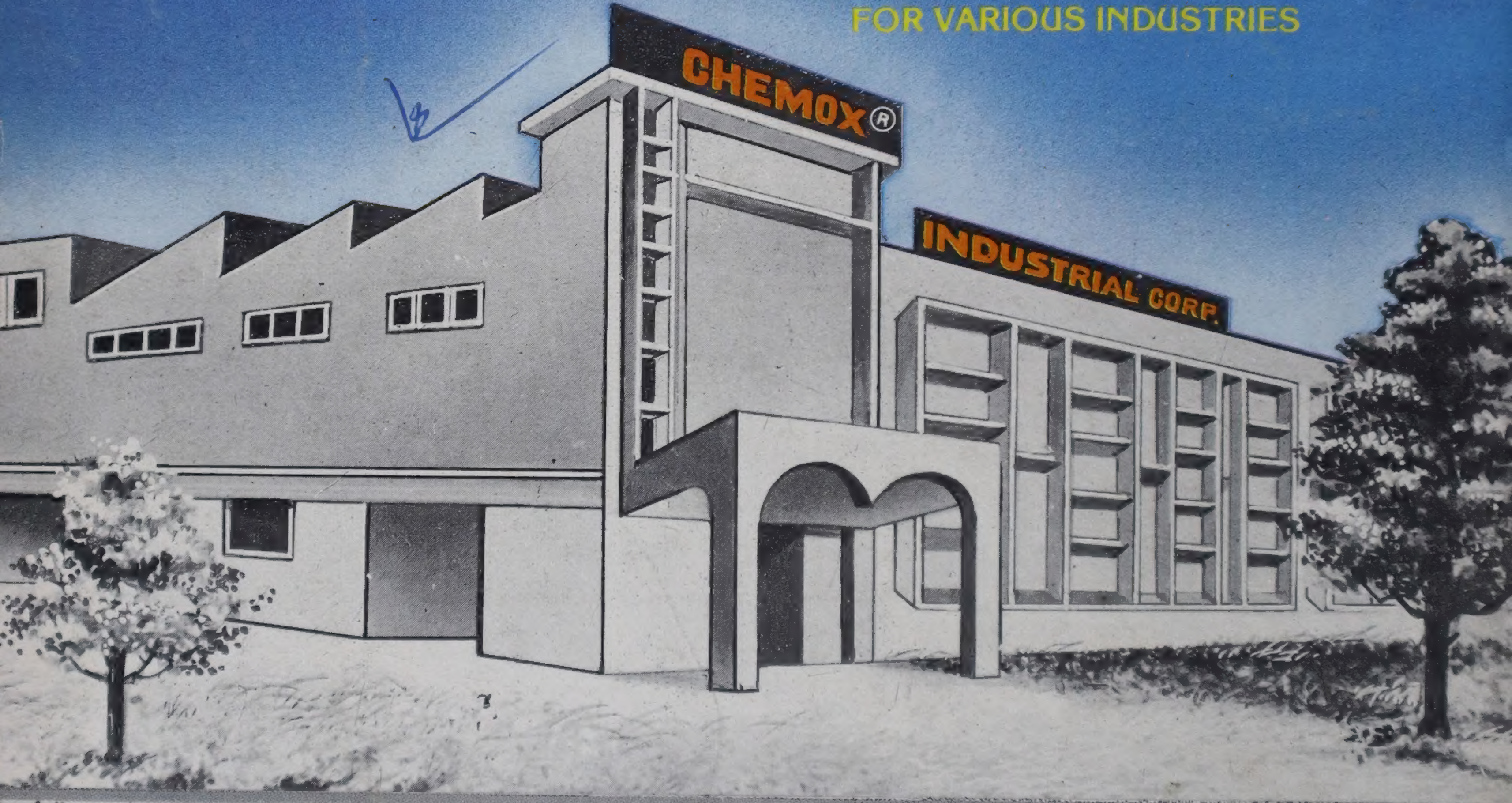

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